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The Electric Light at Abbeville, France.

Whilst in Paris the installations of electric lighting, which preceded those of all the other great cities of the world, are everywhere being abandoned to a certain extent, notwithstanding the discontent provoked by the acts of the gas company, certain provincial cities are undertaking some very interesting experiments. No comparison whatever can be instituted to-day between the capital of France and the principal cities of other countries, on the subject of lighting the streets by electric processes; for in Paris all the experiments, notwithstanding the results they have furnished, have been very little encouraged, and nearly always permanently abandoned after a period of working more or less long.

But since the city of luxury gives us no more occasion to register new manifestations in this line of progress, we are happy to be able, without leaving our own country, to lay before our readers the results of some recent experiments which have been made in the chief town of the *arrondissement de la Somme*, whose population scarcely exceeds 20,000 inhabitants.

Our illustration gives a perspective view of the principal square of Abbeville, brilliantly lighted by electric lamps, the sketch from which this engraving was made being furnished to us by Mr. Moynier de Villepoix, whom we now thank with greater justice, because, thanks to his intelligent efforts, the experiments which we now describe have been successfully carried out; and it is also to an Abbevillian chemist, our special correspondent, to whom we are indebted for the information which enables us to give the precise details of this new installation of electric lighting.

THE ELECTRIC LIGHT AT ABBEVILLE, FRANCE.

The Gravier system has been employed; a system which in a more elementary state was exhibited at the International Exhibition of Electricity, in 1881,. Mr. Gravier reduces as much as possible the resistance of the generator, and with that end in view connects his machines in quantity, so as to give them the least resistance, and then excites them by an exterior machine. At Abbeville there are two Gramme machines of the type A, and an excitor in whose circuit is placed an interrupter; the two machines are grouped in quantity and connected to a distributor of six directions, and one can send at will to the latter the current from one or the other of the two machines. The motive force is produced by a steam engine, furnished by Mr. Delapierre, manager of the Linier Bank, and, as its power is considerable, a very regular movement, which produces 1,200 revolutions per minute of the dynamos, whilst the excitor makes only 960, is easily obtained.

The six-direction distributor is placed in a building on one of the sides of the square, the length of the lead which connects the machines with the distributor is about 2,250 feet, which makes, with the return wire, a circuit of about 4,500 feet; each circuit of lamps averages 1,200 feet in length, with a lead of .171 inches diameter, and a return wire of .045 inches diameter, as in the installation of the Palace of Industry, by reducing the resistance of the machines. Transportation of the current to great distances is interdicted, and it is necessary to employ conductors of large diameter and to use circuits as nearly as possible of equal resistance.

The following are some practical measurements taken with a Deprey galvanometer placed in derivation, for which we are also indebted to Mr. Moynier de Villepoix.

The resistances have been calculated from the diameters of the wires, and are about 3.60 ohms per lamp circuit, without counting the resistance of the carbons, which may be estimated at ½ ohm.

Resistance of lead, about.....	1 ohm
Potential at the brushes of machines 110	volts
Potential at connecting screw-posts of distributors.....	62 "
Potential at the return wire.....	60 "
Average potential at screw-posts of lamps.....	33 "
Average intensity of current in the lamps.....	9 ampères

A lamp with an intensity of 9 ampères under a potential of 33 volts gives 29.7 kilogrammeters.

The Deprey galvanometers employed for these measurements had a fine wire for indi-

cating the fall of potential, and a coarse wire for the intensity.

Whatever may be the value of the process employed, a process which we have besides already appreciated in this journal, we congratulate the organizers of the experiments which have given the old Abbevillian city a splendor and a nocturnal animation entirely unprecedented Our picturesque design shows the charming effect which may be admired every evening from 8.30 to 10 o'clock, in the great square where the central lamp is suspended at a height of 52 feet, whilst those of the neighboring streets have an elevation which varies between 24 and 30 feet. All the lamps were without globes during the first nights of the experiments, but latterly ground glass globes have been employed, which soften the crudity of the electric rays and prevent fatigue to the eyes.

The happy combination of lights results in a very uniform effect, and permits the perceiving, as in full daylight, the details of the buildings as well as the diverse scenes produced by the promenaders; among the latter we cannot resist the temptation to notice an entire originality special to this city, which proves its taste for progress. One may perceive in the design towards the left-hand side of the square, a species of vehicle having something like the shape of the old Sedan chairs, and somewhat like a litter. It is called a *vinaigrette*, a sort of box nearly square mounted on two wheels with shafts in front, in which is harnessed the *vinaigrier* or porter who draws it, whilst a second pushes it from behind, forming between them a quadruped in two portions. The vinaigrette serves to day for the transportation of the natives of the little city when they go to the ball, to the theatre, to dine out, or even to church, and Boucher de Perthes has left some details about this vehicle, which has survived so many revolutions, which we will reproduce.

The *vinaigrier* is ordinarily of the male sex. Nevertheless, he sometimes is assisted, as acolyte, by his wife; then monsieur drags while madame pushes. The vinaigrettes are of two sizes, with seat for one or seats for two, and the good burghers of Abbeville continue to find this mode of locomotion very convenient, although its rapidity has nothing comparable with the modern means borrowed from steam and electricity.

It appears that in 1848 some profound humanitarian found that the calling of *vinaigrier* was degrading, and its suppression was talked of; but the corporation objected, saying that the first right of the citizen was the privilege of living by his trade when it was honest, and saying that it was no more degrading to carry a man upon one's back than to carry a dog under one's arm. The vinaigrette was thus preserved, to the satisfaction of all, and it is thus that we see it to-day under the rays of the electric light, seeming to mark by its strange appearance the immense step which separates its origin from the present time, so fruitful in marvels.

We will state, in conclusion, that the trials of the electric light executed at Abbeville present a special interest from the point of view of the utilization of natural forces, for the River Somme can furnish at Abbeville a natural force of at least 300 horses, absolutely unused, and which it would be very easy to use to-day, either for the complete electric lighting of the city, or for industrial purposes, through the possibility of the transportation of energy by means of electricity.

C. C. SOULAGES.

The Electric Railway.

The electric railway at the Expo-ition, now that the mechanical difficulties have been overcome, is in successful operation, and in its way the event possibly should create as much wonder as the launching of Fu'ton's steamboat, and doubtless will hereafter be pointed to as marking a new era in railroading. The delay thus far has been owing to the clumsy construction of the road-bed and equipment, and in no sense to the motor, although the management debated a long while as to the motor to be employed, and finally settled upon the Weston machine, controlled by the United States Electric Lighting Company, as the one most likely to furnish the greatest and most evenly distributed force. If any credit is to attach to the operation of the railway, it is to be given largely to the Weston machine as supplying the motive power. The United States Company in its exhibit at the north end of the great Exposition, furnishes another display of the power of the Weston machine by the pumping of a large body of water to a height of ten or twelve feet, which afterwards resolves itself into a picturesque cascade.—*Chicago Tribune.*

On a New Electro-dynamometer for Very Feeble Alternate Currents.

(*Translated for the* REVIEW *from La Lumiere Electrique.*)

This instrument, intended solely for the study of very feeble alternate currents, is based on a principle, which to my knowledge, has not yet been utilized in its greatest simplicity.

Let us suppose the magnetized needle of a reflecting galvanometer to be replaced by a small rod or piece of iron wire, which can oscillate in a horizontal plane, and which, in its position of equilibrium, will be perpendicular to the magnetic meridian.

In these conditions the iron rod is not influenced by terrestrial magnetism, and if it is well annealed and of good quality, it will present no trace of magnetic polarization. Let us suppose, also, that the convolutions of the coils form an angle of about 45° with the magnetic meridian, and that a current is caused to circulate in the wire of the coils; whatever may be its direction, it will temporarily magnetize the rod of iron and tend to bring it into a direction perpendicular to the plane of the coils.

Thus, although the currents are alternate, the deflection of the rod is always in the same direction.

The simplicity of this apparatus consists in the suppression of the movable solenoide of ordinary electro-dynamometers, and also the complicated system of suspension which accompanies it. The movable solenoide is here replaced by the iron rod, whose function is the same; it can be suspended by a thread of feeble torsion, or better, by a cocoon thread of the bifilar system. The extreme lightness of the movable part renders the instrument very rapid and very sensitive.

One might suppose that the alternate magnetizations of the iron wire would not respond with sufficient rapidity to the reversals of the current. But the phenomena of the telephone seem to prove that for feeble currents, iron obeys almost spontaneously the magnetizing action. If we admit that, and if we also admit that for feeble currents, the magnetism induced is proportional to the intensity of the current, the theory of the instrument is perfectly simple. It remains only to study its sensitiveness. With this in view, I have constructed an apparatus, which although crude, has enabled me to make some experiments. In place of the rod of iron, I have employed a bundle of iron wires well annealed; they had a length of .66 inches, and a diameter of .005 inches. To this bundle was attached a very light little mirror, and the whole system was suspended bifilarly by a thread of unspun silk. The interior diameter of the coil was 1.35 inches, and its length 1.49 inches. The copper wire of about .007 inch thickness, had a resistance of 175 Siemens units, and formed a layer of about .03 inch. The telescope and scale for reading were placed at 6 feet 6 inches from the instrument. In my experiments I used a Siemens telephone, having a resistance of 195 Siemens units.

The conditions of the instrument, particularly in that which concerns the solenoïde, were evidently not of the best. Nevertheless, the results were quite satisfactory. When the trumpet attached to the Siemens telephone was put into operation, the deflection of the bundle of iron wires was too great to be observed. In speaking in a low tone, with the telephone to the mouth, an appreciable deflection was observed. Likewise, in crying aloud at a distance of 19½ inches, a deflection was obtained, and also in holding the trumpet at 9¾ inches from the mouthpiece of the telephone and breathing on it in a manner so as to produce the most feeble sound possible. These results, obtained by such a rude instrument, led me to hope that with more favorable conditions, and (if that be necessary) by the employment of some easily imagined devices, one could construct an electro-dynamometer of an extreme sensitiveness. The instrument should facilitate the study of small alternate currents, and should also replace with advantage the use of the telephone in methods known as the *reduction to zero*, where the use of the telephone is often very troublesome.

M. BELLATI,
Professor at the Institute of Physics at Padua.

Secondary Batteries and the Electrical Storage of Power.

Prof. Lodge delivered his second lecture on this subject at the Society of Arts on Monday evening of last week, when Mr. W. Preece presided

Prof. Lodge said there were one or two further experiments with the little battery before him (with which he had experimented on the occasion of his previous lecture), with which he should begin, because they really threw a good deal of light on the action of the secondary battery. He wanted to show the extreme value of peroxide of lead on the positive lead plate.

For instance, let them take a piece of clean platinum and put it into the cell instead of the negative lead plate. They had platinum on the one side and peroxide of lead on the other, both highly electro-negative substances (experimenting). That amount of current was given by platinum opposed to the peroxide of lead; the platinum acted as zinc, compared with peroxide of lead. Putting in a piece of clean copper as the negative plate, they got a current which lasted longer and which was able to ring a bell. The copper plate, in fact, gave very considerable power and lasted fairly well. The copper was dissolved and formed sulphate of copper. The action of the battery was over when either the copper was dissolved or when the sulphuric acid was consumed and turned into sulphate of copper.

Instead of copper he would now take a piece of lead, which they would imagine to be still better than copper. He put the lead in the acid; he tried it with the current, and the current was immediately over. The plate seemed done for, and why? Because the clean lead plate had got into such a state that it would give a current neither with peroxide nor with hydrogen, neither with zinc nor with platinum. It was, in fact, almost as if it were a piece of wood; it was coated with an insulating film. If he put in a piece of spongy lead, the current would go on for a long time, so that by giving the lead a large surface, by making it spongy, as might be done mechanically, chemically or electrically, they got the negative surface so large that no scum formed on it for a long time. It was owing to the smooth and limited surface of the clean lead that the scum formed almost instantly. It was, of course, however, a question of degree.

Another point he wished to call their attention to was the great advantage which the inactivity of lead after the first instant conferred as a support for the peroxide. If he took a piece of clean lead and opposed it to the peroxide plate, it refused to give a current after the first instant. The insolubility of sulphate of lead, which to some extent was a trouble, was, however, to some extent a gain. The plates of which a battery was made might be spongy, or might be perforated, or might be folded. After describing how these leads were made, the lecturer went on to consider the subject of meters.

The means of measuring the current, he said, was nothing else than measurements made in either putting into the cell or taking out of the cell—in charging or discharging. There were meters for the measurement of current, of electromotive force, of quantity, of power and of energy. The two first he would take as fundamental. Then, quantity was current multiplied by time, current multiplied by electromotive force was power, and energy was quantity multiplied by electromotive force or power multiplied by time. He would not say anything about current measures. Any low resistance galvanometer would act as a meter for current, and any high resistance galvanometer would act as a measurer of electromotive force.

To measure the current of electricity the most direct and simplest way, in some respects, was by some such arrangement as this (showing model). He had found the instrument (of which that was a model) exceedingly valuable. It consisted of a balance suspending a copper cylinder in a vessel of copper lined by a much larger copper cylinder. He should totally submerse it in the liquid, but no more, and now he would put the current on, so that the outer plate was positive and the inner negative.

The inner plate would receive a deposit of copper, and as it did it would get heavier and the balance would sink, and they should find the plate at the bottom of the cell before very long.

Hence it enabled them to say how much was in the cell, because whatever had gone in had deposited copper, and whatever had come out had removed copper.

Of measurers of energy or quantity multiplied by electromotive force or power there were several. Mr. Boys, he believed, had several, but not in a state of perfection. Ayrton and Perry had also their recently constructed power meter, which was very simple, and might very likely give very good results.

Having previously discussed the charging and discharging of the cells, they had now to consider how to use the discharge. The first and most obvious use was lighting.

The advantages of secondary battery purposes for lighting were found when the lighting was in a traveling conveyance—in a train or a ship, though in a big ship, with so much engine-power on board, they might run from the dynamo direct. But supposing they wanted to light a cab, they might carry a box with them sufficient to keep a small lamp lit. And the use of the battery for stationary installations was when they wanted a greater power than their engine would give. That especially applied to cases where they used steam engines. It did not pay them to let an engine lie idle all day and have it working at night only; it was better to have it running regularly. And when they wanted to use the light, having stored it up in secondary batteries, they could run it off at a high rate of speed and thus increase the power of the steam engine, compressing its total energy into smaller compass, and at the same time they gained in security, because the batteries once charged were not quite so liable to break down as a belt was to slip. A third advantage of the secondary battery was the steadiness with which it produced the light.

The lecturer here showed this by the lighting of several Swan lamps and also a Pilsen arc lamp in the hall.

There was nothing new in the lamps, but they shone with absolute steadiness, there being not a sign of fluctuation about them. That resulted from lighting from the battery direct. They might put out any of the lamps without interfering with the others, and that was not so easily done with dynamos. One great use of storage batteries, which was pointed out by Sir William Thompson at the British Association meeting at York, was to have them act as receivers in the transmission of energy. The theory of the economical transmission of energy was worked out practically by Dr. Siemens a few years ago. He pointed out that for economy they must have as high electromotive force as possible. A set of batteries as a receiver was far more economical than a set of dynamos. An economical force from a dynamo could only be obtained by running it at an enormous speed. There was a certain limit, however, to that speed, and if they wanted an excessive electromo-

tive force, they must have a fair internal resistance. The more suitable machines were those which gave a high electromotive force.

Then they came to the driving of motors by the secondary battery. It would be found an advantage when the secondary battery received the power from a distant station. A motor was the same as a dynamo, except that the field-magnet in a dynamo was much smaller and more compact. There was no limit to the size of the field-magnet, but there was to its weight. The reason why the Edison machine was such a good machine was because the magnet was so gigantic. If they considered the action of a magnet when it was excited, they would perceive that all that the current was doing was to generate heat.

There was a remarkable analogy between the production of magnetism in iron and the muscular exertion of an animal. To raise the magnet to its highest power required work, and to keep it there required work. It would be a great advantage if the iron would keep the magnetism.

Professors Ayrton and Perry had lent him a motor (exhibiting motor) and the peculiarity of that instrument was that the field-magnets revolve instead of the armature (experimenting). Motors were by no means perfect at present; there would be an immense development in them yet.

Coming now to locomotion. If they were to have a railway driven by such means the simplest plan would be to attach a motor to each wheel of the carriages, they would then be independent of an engine. In that case he thought it would be more convenient to have a carriage run from a station every minute than a train every five minutes. He did not say the running of a carriage every minute would suit the underground railway, considering there were so many trains there already; but there would be an enormous advantage in their having the trains run there by means of electricity, and it seemed to him absurd to put coal-burning locomotives on the underground railways when this system could be readily adopted.

The dynamo, again, was so exceedingly well suited to a small screw boat that he could not help thinking that there was a great future for the dynamo in marine propulsion. The weight of the dynamos for big ships would be too heavy; but he doubted not but that some means would yet be found to make them lighter. For a central station, however, the weight of the battery boxes was of no consequence.

The practical development of electrical appliances in the near future he felt would probably be something extraordinary, and he only hoped they would have as great a social influence as they would have a mechanical. He also trusted that the result would be the abolition of smoke and the purification of the air. A greater benefit to society than that he for one was unable to imagine.

On the motion of the chairman, a hearty vote of thanks was awarded to Prof. Lodge for his lectures.

Mr. R. G. Brown's Speed-regulator for Engines of Steamships.

The greatest danger of breakage to which the screw of a steamship is subjected arises from the pitching of the ship; when the stern of the vessel is out of the water the screw meets only the resistance of the air, and attains a great velocity; the vessel, when the bow rises, plunges in the water with this great speed, and puts the arbor of the machine in danger.

Different methods have been sought to avoid this source of danger. In the methods hitherto proposed there has generally been employed a float placed in a canal by the side of the screw, and put in communication by an arrangement for the transmission of the movement with the valve of the engine. In the system of Messrs. Sangater & Shelton, of Buffalo, N. Y., the communication between the float and the valve is made electrically. (See English patent, No. 2,991,876.) All of these arrangements generally operate after the damage has been done.

We find a new idea in a patent taken out by Mr. Robert G. Brown (formerly chief operator of the Gold and Stock Telephone Department of New York City). It consists in the employment of two electrical contacts, one insulated and placed on the hull of the ship near the axle of the screw, and the other in communication with the keel and continually submerged. In the normal position of the ship, the two contacts are in electrical communication through the water, and close a circuit which includes a dynamo machine in movement and an electro-magnet whose armature is always attracted.

The stern of the ship, in rising out of the water, breaks the circuit, and permits the armature, regulated by a retracting spring, to operate a device which puts in motion a small steam engine; the latter then closes the valve of the engine of the vessel. Several contacts may be arranged, superposed, opening and closing the valve more or less, according as the submersion is greater or less.

Our esteemed contemporary *Engineering* (London) says that a useful form of battery has been brought out by the British Insulite Company (limited). The cell is sealed and therefore can give off no fumes into a house where it may be employed for bells or other purposes. The outer vessel, which is rectangular, is made of insulite, a material impervious to liquid and self-cementing. A partition of porous clay is cemented diagonally across the cell from corner to corner. In one corner is a zinc rod and in the other is a carbon rod surrounded by pea-like pieces of carbon. A special solution is employed to excite the battery.

The connections are made by binding screws on the lid, in which there is also a release valve to provide for expansion of the air within. The cell, when sealed, can be inverted or put in any position without damage. The battery lasts two years without renewal of zinc, and is well fitted for bell work.

In the use of the electric current for reducing hard ulcers and tumors by electricity, a soft electrode of asbestos soaked in saline water is usually employed; but Dr. Apostoli has introduced a paste of fuller's earth with great success. It readily adapts itself to all the sinuosities of the skin and gives an intimate contact.

Moreover, it adheres to itself and requires no artificial binding. It dries very slowly and the current therefore retains its proper strength for a considerable time. Its employment will doubtless be advantageous in other galvano-medical applications.

Niagara's electric illuminations are much more extensive this year than last, and well worth a long journey to witness. They not only charm bridal parties, but people who have been married for years.

In describing an apparatus for stopping engines by electricity the *Dundee Advertiser* says: "The huge engine at Manhattan Works (Colonel Sandeman's), working at from 600 to 700-horse power, and driving a fly-wheel of about 35 tons weight, formerly took two minutes to come to rest after the steam had been taken off. This apparatus has been fitted to it, and the ponderous engine is now brought up in thirty seconds. To see this powerful, majestic piece of machinery, the developer of power for a large range of works, almost immediately brought to a standstill by the mere touching of a button at the far end of the building, is an impressive illustration of the easy control of enormous force by wisely ordered arrangements. To mill-owners the utility of the apparatus will be evident."

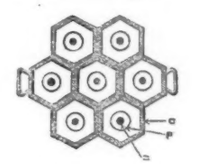
Negotiations, which have been for some time in progress, are said to have been completed, by which the Connecticut River Telegraph line has been sold to the New England Telephone Company. This is the company whose offices are in Hartford and New Haven. The line of telegraph referred to extends about fifty miles, from Hartford to Saybrook, and is said to have been owned by Mr. Gershon B. Hubbell, who built it. The terms of the sale are not known at present writing.

An Electric Reading Lamp.

We annex illustrations of an electric reading lamp designed by Mr. J. Munro, of Croydon. The incandescence lamp, on account of the small heat it gives out, and the steady glow of its carbon filament, is well suited for the purpose. It is, moreover, poor in those ultra-violet rays, which M. Chardonnet considers to be detrimental to the sight when produced in excess, as they are in the electric arc lamp. But the intense brightness of the carbon filament has a dazzling effect of itself upon the eye. Care has been taken to shade the lamp, so that the filament is usually hidden from the line of sight. This is done either by a green shade, as shown in the illustrations, or by a ring of ground glass surrounding the bulb, like a collar, about the height of the filament, but leaving the clear glass above and below.

The lamp consists, as shown in Figs. 1 and

FIG. 1.



2, of a mahogany or teak base, *A*, *A*, made in the form of a box, to contain the battery supplying electricity to the filament, and fitted with handles for lighting it by. From this base, which is only some three or four inches high, rises an ornamental metal standard or tube *S*, up and down which a clamp *C*, carrying the jointed arm *M*, can slide and be fixed at will. The jointed arm *M* supports the bulb *L*, and carries a second jointed arm, which holds the screen *N* (Fig. 1), and permits of its being inclined and used as a reflector. A screen of thin wood, paper, silvered metal, or other suitable material is employed.

Since the standard *S*, can turn around its vertical axis by a joint near its foot, the light can be brought to bear on any point within the reader's reach, or serve for several readers sitting together. It can be inclined over a sofa or lounge, so as to shed its light on the book or paper, and it also can be supported at the full length of the arm above a writer's desk.

When not in use as a reading lamp, the jointed arm can be folded up within the tubular standard, and the contrivance becomes an ordinary table lamp. The battery preferred is that prepared by Dr. S. H. Emmens and Mr. G. V. Holmes, since it gives a good light for six hours without replenishing with solutions

Fig. 2 is a section through the battery across the line, *A*, *A*. It is a honeycomb of seven hexagonal cells made of carbon plates *C*, joined at their sides, and each holding a porous pot *P*, containing a cylindrical rod of zinc *Z*. The exciting solutions are of a special non-fuming mixture devised by the gentlemen just mentioned.

The lamp is made by the Duplex Electric Light, Power and Storage Company, of Soho Square, and is capable of yielding a light of ten candles for five or six hours without recharging, at an estimated cost of 2d. The wires for the circuit may either run within the stem, or be carried by a silken cord attached, and the light is turned on or off in the usual way.

It may be added that the combined battery and lamp can be shifted from one place to another, as it is independent of any connection with main wires supplying current from without the house. When, however, electricity is supplied by companies to dwellings, the same device will serve with a flexible tap-circuit from the mains, or, as the designer proposes, by employing a small secondary battery in place of a primary one, to store up sufficient current for a night's work. The primary battery we have described may itself be modified for this purpose.

Sub-Marine Electricity.

As was said in the last number of the ELECTRICAL REVIEW the application of electricity to the explosion of submarine mines dates back so far that it would seem little less than presumption for any one at this late day to claim for an invention anything more than adaptation or possible improvement. As long ago as the Crimean war the Russians, under the direction of Jacobi, used electrically connected submarine mines both for purpose of attack and defense.

Thus, a torpedo arranged to be exploded electrically when coming into collision with a vessel, was discovered at Teni-Kale during the Kerstsch expedition in 1855.

Some arrangements were made by the British at the conclusion of the war to apply electricity to the explosion of large powder charges for the removal of sunken ships, &c., in Sebastopol and Cronstadt harbors.

In 1859 a system of submarine mines, to be fired through the agency of electricity by operators on shore, was arranged by Von Ebner for the defense of Venice, which, however, never came into practical operation.

Early in 1860 Henley's large magnetic electric machine, with a supply of Abel fuses, and stout india-rubber bags, with fittings to resist water pressure, were dispatched to China for use in the Peiho River, but no application appears to have been made of them.

The subject of the utilization of electricity for purposes of defense, however, did not receive systematic investigation in England or other countries until some years afterward when the great importance of submarine mines, as engines of war, was demonstrated by the number of ships destroyed and injured during our civil war.

The application of electricity to the explosion of submarine mines was of frequent occurrence during the latter contest, and arrangement for its extensive employment made rapid strides toward perfection in the hands of both Federals and Confederates.

The explosion of submerged powder charges by mechanical contrivances, either of self-acting nature, or to be set into action at desired periods was accomplished as far back as 1583, during the siege of Antwerp, by the Duke of Parma, and from that period to 1854 mechanical devices of more or less ingenious and practicable character have been from time to time applied to some small extent in different countries for the explosion of torpedoes.

The Russians were the first to apply self-acting mechanical torpedoes with any prospect of success, and had the machines used for defense of the Baltic been of larger size (they only contained 8 or 9 pounds of gunpowder) their presence would probably have proved very disasterous to some of the English ships which came into collision with and exploded them.

Various mechanical devices for effecting the explosion of torpedoes by their collision with a ship were employed during the civil war, some of which proved very effective. But although, in point of simplicity and cost, a system of defense by means of mechanical torpedoes possessed decided advantages over any extensive arrangements for exploding submarine mines by electric energy, their employment is attended by such considerable risk of accident to those at whose hands they receive application, that under many circumstances which are likely to oc-

cur, they become almost as great a source of danger to friend as to foe.

The most important advantages secured by the application of electricity as an exploding agent of submarine mines may be thus enumerated:

They may be placed in position with absolute safety to the operators and rendered active or passive at any moment from the shore; the waters which they are employed to defend are therefore never closed to friendly vessels until immediately before the approach of an enemy; they can be fixed at any depth beneath the surface (while mechanical topedoes must be situated directly or nearly in the path of a passing ship) and they may be removed with as much safety as attended their application.

There are two distinct systems of applying electricity to the explosion of submarine mines.

The most simple is that in which the explosion is made dependent upon the completion of the electric circuit by operators stationed at one or more posts of observation on shore; such a system depends, however, for efficiency on the experience, harmonious action and constant vigilance of the operators at the exploding and observing stations, and is moreover entirely useless at night or in thick weather. The other is that of self-exploding mines.

Gen. Abbot, United States Engineer Corps, has done more than any other man in this country in perfecting this system.

A College of Electrical Science.

An urgent need exists for an educational institution which shall prepare young men and women for active and intelligent work in the various departments of electrical science. The rapidly extending applications of electricity to commercial and scientific purposes has created a demand for electrical engineers and superintendents, which can only be met by providing suitable means of instruction for all who may desire to enter this inviting and profitable field of labor. Wonderful as are the advances already made in the utilization of the electrical current, marvelous as have been the discoveries of the little handful of enthusiastic laborers in this new field of thought, it is safe to say that the grand achievements which have crowned them with wealth and honor are as the dust in the balance when compared with the future of electricity, when thousands of educated brains and hands shall be engaged in the same fruitful field. That unwearied searcher after the mysteries which were, until lately, utterly hidden from human sight—Mr. Thomas A. Edison—was asked if he had not got out of electricity pretty much all that we should be likely to get, and replied, "Electricity is a ten-acre lot, with a very high, close fence around it. All we know about it, so far, we have gained by peeping through the cracks in the boards."

If the future of the science of electricity may be conjectured from its past, what marvels may we not justly anticipate? For years the swift messenger of man's written thought, it now carries his living voice over long distances, in time so brief as to be beyond computation. The thought and the voice having been conveyed with a rapidity which annihilates time and space, the next achievement is to carry man himself over land and water with the force and speed of lightning—and that triumph cannot be long delayed. The future of electric lighting is likely to be even more wonderful than its past. In every branch of science and art wherein electricity has broadened the scope of man's knowledge, the achievements of the past may well be considered as merely the steps to loftier heights of usefulness and power. Wherever man is, on the land or on the sea, there will the deeds and the voices of the world of mankind be instantly revealed to him—there will his pathway be lighted by night by that modern "pillar of fire," which vies with the sun in brilliancy; and thither will his fellow-man be carried on the wings of this mystery of mysteries. The key is turning in the lock; the great gate is destined to be flung open; the fertile field will speedily be ready for its army of earnest tillers.

A cry comes up from the corporations and the capitalists who control the vast interests involved in the various enterprises dependent upon the skilful and economical employment of electricity for their success, for competent, trained helpers. There is work ready to-day, in the very infancy of electrical science, for thousands of thoroughly educated electricians, in carrying out existing enterprises and in inaugurating new ones, and on the not far-distant to-morrow the demand must surely come for tens of thousands and hundreds of thousands of skilled and able directors of labor in this broad field. From whence shall they be sought? The earth does not contain them. They must be created. There is no lack of material, but it is raw material only, and useless until given shape. It cannot be prepared for the great work before it without further training by competent hands. The highest talent in this special direction must be called upon to assist in moulding the electrical engineers of the future.

No college, no educational institution in the world, supplies the education demanded With all colleges and schools of technology which give instructions in matters pertaining to electricity, the study is but an incident—a branch optional as a rule, and deemed of minor importance. The instructor in this has other duties of at least equal moment, and the knowledge gained in this specialty, however useful it may be as a starting point for subsequent research, is far from being a sufficient equipment for the work demanded of an electrical engineer. And so the great demand remains unsatisfied, while the ranks of the old professions are crowded beyond the possibility of profitable employment

It is evident, then, that a College of Electrical Science must be established, and that without delay. In order that the important and needed work may be entered upon right speedily, and carried forward to success, the friendly interest and active co-operation of all to whom these presents shall come is earnestly asked. The site for the college is Menlo Park, the spot known the world over as the home and workshop of Edison. Its situation is charming, its atmosphere salubrious, its surroundings in every way admirable. In all deeds of conveyance of the lands of Menlo Park strict prohibitions exist against nuisances of every nature. Offensive, demoralizing, unsanitary and other objectionable business, buildings and proceedings are thus rendered impossible for all time.

To the establishment of such a college at this point, all the prominent electricians in the United States, as well as some in England and on the continent of Europe, will, it is believed, give their cordial approval, interest themselves in its behalf, and honor it with their wise counsels.

The plan is to incorporate a company for the purpose of erecting suitable college buildings during the summer of 1883, and to be ready for pupils in September. The most competent electricians will be secured as professors and teachers, and every electrical appliance of value will be employed in the workshops and laboratories. The instruction will be thoroughly practical in character, and every pupil will be expected to be able to construct the various appliances used in his profession. Degrees will be granted to such as shall complete the prescribed term of study and give satisfactory evidence of adequate knowledge and skill. The aim will be to make the college self-sustaining, and to constantly increase its educational facilities by the use of means and appliances which no institution teaching electrical science as a mere adjunct to other courses could be expected to supply. To this end, a museum, the nucleus for which already exists, will be at once established, which shall contain all that is useful and much that is curious in this branch of science, and which shall illustrate the wonderful progress made by man in constraining the lightning to his will and service.

Every effort will be made to make Menlo Park and its Electrical University the seat of knowledge and interest in its own branch of science. Electrical inventors will be encouraged to this, as to a common, sympathetic and appreciative center. The electrical power actuating the machinery of the college workshops will be supplied at moderate cost to worthy inventors who may wish to develop their inventions under the best possible conditions.

The thoughts herein embodied have been communicated to a considerable number of prominent gentlemen, and the proposition meets with very cordial approval. The facts stated are undeniable. The pressing demand for competent electrical engineers is everywhere acknowledged. The utter lack of adequate educational facilities for the multitude who seek it is freely admitted. The appropriateness of Menlo Park as the seat of the first electrical college of the world strikes every mind with peculiar favor. It remains only to enlist the combined action of a large number of the best citizens of the country to secure for the project complete success. To this end this circular is addressed to you, and your co-operation is solicited.

FRANK FULLER.

Menlo Park, N. J., April, 1883.

Mexican Life and Incidents.

VERA CRUZ.

The principal seaport town of Mexico is one of the prettiest cities in the republic It is laid out something like Philadelphia. The houses are all about the same size, and built of stone or brick. The fronts of the better-class houses are made of stone, carved in all manner of shapes, and are very attractive. The work is done by a laboring class called *peons;* they are half-civilized Indians. In every house you will find flowers and fruit trees, and in some houses bananas, oranges, cocoa-nuts, pomegranates and figs grow in abundance. All these trees are planted in a court-yard, and I assure you it makes a splendid retreat from the sun, and in the evening it puts one in mind of a garden of night-blooming cereus.

In fact, words cannot tell the wonders of these gardens; they have to be seen to be appreciated. Leaving V—— C—— at 5 o'clock A. M. by Palmer and Sullivan Railroad, we go through a magnificent country, where everything imaginable is growing in abundance, and gradually getting higher and higher until we reach Orizaba at 10 A. M., and we are 3,300 feet above the level of the sea. Orizaba is situated on a table-land, two miles wide and two and a half long, between four mountains. It is a summer-resort city; has a very fine calsada, plaza and theater; the streets are straight and clean; the houses are somewhat better than those of Vera Cruz; a band of music plays every night in the plaza—very fine music, indeed. It is well known that the Mexicans have a musical talent that is only surpassed by the Italians. The theater is of brown stone, with pillars of marble. The inside is handsomely decorated, and is capable of holding from 5,000 to 6,000 persons. The churches are not very attractive on the outside, but the inside is magnificent; some of the altars cost $200,000 to $500,000. The life-size statues of Mary, the mother of Jesus, and also a life-size statue of Jesus blessing little children, are worth seeing.

Another attraction is the snow-clad peak of Orizaba. The only way that one can get there is by going on burro-back, and I advise all tourists making the journey to carry heavy clothing, as it is going from summer into the dead of winter. Leave Orizaba at 10 A. M. for city of Mexico.

The scenery during the greater part of the route is magnificent, including rich vegetation, luxurious flowers and birds of bright plumage, fields of corn and of the maguey plant from which the national drink, pulque, is made.

Standing on the rear platform to enjoy the view up the mountain or across the great plateau, we pass gorges, waterfalls, through fifteen tunnels, over deep ravines on high bridges, and at 9 P. M. we reach the capital city, the pride of the Mexican's heart, with its *luz e'ctrica*, and we are *mas junto* to the moon than when we left Orizaba. The square flat-roofed houses with balconies surrounding large courtyards, multitudes of loafing servants and everyone speaking a different language, serves to put one in mind that he is a foreigner in a foreign land.

The Cathedral, with its million-dollar life-size figure of Christ, the markets, the plaza, the national pawn shop, the Alemada, and the drive to C——. All the better families of Mexico drive to C —— in the afternoon, and the young gentlemen go on horseback. All the gentlemen stand in a line while the carriages pass and watch the young ladies. Then the carriages stop and the ladies watch the gentlemen pass until they reach C——. All of which is very beautiful. Will explain further on about the customs of the young men stopping to watch the ladies.

The Mexican Central Railroad leaves Mexico City bound for Lagos, 415 miles distant. The route is not as beautiful as that from Vera Cruz to Mexico City. But, nevertheless, it is very interesting. We pass through the great cut of Hochistongo, built during the Spanish rule. It is cut in solid rock, 80 feet wide and two miles long. Its depth is from 100 to 200 feet deep. Passing through Tula you see from a distance the church said to be the oldest on the American continent. It looks very old and very much dilapidated.

Arrive at Siloa at 5:15 P. M., and from there take a branch road to Guanajuato, a great mining center. Guanajuato is not a beautiful city; it is situated between seven mountains, and I do not think that there is four yards of straight street in the town. Most all the houses are built on the sides of the mountains, and one can enter a house, go up six stories and walk out on the next street. Guanajuato is not noted for its beauty, but for its riches. Within a distance of five miles from G'to there are not less than 150 mines working and paying. La Mina de Cata, Vallenciana, Mina de Mellado, Mina de San Pedro are the most valuable, and will pay anyone the time and trouble to visit them. Mining is done here in a very primitive style. The shaft is run by a mule, and the only way to get down is to go on the side of the bucket that they haul up ore in. When one enters a mine he stands on the edge of the bucket and hold on the rope with a grip-like death. For if you fall there will be no one to carry home your *post-mortem* examination. Down, down you go for 600 feet, and then get out and walk in total darkness, only the candle of the miner to give you light, and the manager of the mine saying at every step: "*Cudado amigo,*" in English, be careful, friend We enter 100 feet and then get down on our hands and knees and crawl to where the miners are drilling holes with a bar and hammer; others carry the ore in sacks to the shaft and dump it in the bucket, and then it is hauled up and sorted, carried to the manager's house where there is a large court-yard in which there is a large stone wheel and it is crushed. After it is taken out and placed in another courtyard and mules tramp it until they separate the ore from the dirt. A mule is two years old when he is put to that work, because the acid they mix with the ore eats their hoofs off. Leave Guanajuato at 3 P. M. to make connections with the train at Siloa; from Mexico at 5.15 P. M.; leave Siloa at 5.18 for Leon and Lagos. From Siloa to Leon there is nothing to be seen but a plain. Arrive at Leon at 6.15 P M.; a very pretty city. La Casa, Municipal, Lojo de Agua, Calsada, Plaza, and one of the finest drives to be found in Mexico, are some of the attractions; also the Theater, which is considered the prettiest in the country. In this city is the general office of the Compañia Telefonica Central, with Mr. H. W. Gorham as manager of the city, and as we passed the door he invited us to enter, and it paid us, for here we have one of the prettiest telephone exchanges in the country, with 38 subs working on the switch, and he expects to have fifty by June, or as soon as they get the line built from Guanajuato to Leon.

The politeness of the Mexicans is one of their charms, when one understands the customs of the country. It you do them a kindness, or compliment, then they will

say to the first, "Mie gracias por en bondad" (in English, "I thank you for your kindness"); to the second, "Para servir á U. ("I am at your service"); "A su dispocicion" ("At your disposition)" [the two are the same]; and on entering their houses they will say, "Sabe U. este es su casa" ("You know this is your house"), which serves to make a foreigner, especially an American, rather uncomfortable. They also have a custom of inviting you to their house, or to go and have chocolate, when they do not mean it; and if you go they would consider you very rude, and no doubt be an enemy all your life Their customs in the houses are: In the morning they rise at 9.30, and take chocolate with a sweet bread, called *molletes*. A gentleman, if he has anything to do, starts from the house at ten. All the ladies sit down and think what they will do in the afternoon, or get their powder and paint ready to paint themselves. In the afternoon, at one o'clock, they have breakfast—about the same as our dinner. After dinner all the houses are closed, and also all business is stopped for two hours, and all the people go to sleep At 5 P. M. all the young ladies sit in the window to watch the young men that pass—the truth is, to watch their sweethearts, as no lover is allowed to enter the house of his lady-love unless he has been a friend of the family for many years, and then either the father or mother of the young lady is in the room with him. The only time they have to talk in secret is at 11 P. M., when the young lady comes to the window, and it is impossible for the young man to enter, as in all houses there are iron bars in front; so they talk and kiss with iron bars between them. Another custom they have, if the young man's lady lives on the same block that he does: He walks on the top of the house until he comes to the court-yard of his dear. He then lies flat on the top of the house and talks to the girl, who is in the court-yard, twenty feet below. And another: They talk a deaf and dumb language. The young lady sits in the window, and the gentleman is across the street. He puts his hands on his heart, which means, "I love you." She then throws him a kiss, which means, "*Me, too.*"

The better class of people have a good opinion of new inventions, especially of the telephone, and they take to it very readily. Other inventions, such as agricultural machines, they do not take so readily to; but in time, I think, they will get over their prejudices and use them. They are very slow in taking to engines of steam, such as are used for mines or for flour mills, as they cost a great deal and the expense is greater than the work can be done by hand.

The only enemy new inventions have in this country are the half-civilized Indians, and they think every new invention is of the devil. They tear down telegraph and telephone lines very often; but they are slowly getting over it. Mexicans have no talent for inventions—that is to soy, they are not mechanics—although they are very good merchants. I think they surpass the Jews in selling goods. H. W. G.

Because the sale of bootjacks last year was 91,000 less than the year before, the Detroit *Free Press* rises to inquire, "Is this country going to bed with her boots on?" Not by a large majority. It indicates that the feline race is dying out.

The rapid growth of the electric light industry, and the corresponding growth of popular interest in the subject, have created a demand for information upon electrical topics. This demand is being met, both in this country and in Europe, by the publication of numerous treatises, both technical and popular, and also by many periodicals devoted specially to electric interests. Of the latter class, the leading paper in this country is the ELECTRICAL REVIEW, of New York, a handsome sixteen-page weekly, which has been mentioned before in these columns. Like the *Journal*, it aims to be an epitome of the progress made from week to week in the industry it represents.—*Sewing Machine Journal.*

Correspondence.

Editor Electrical Review:

SIR: Would one of your many readers explain fully how I can connect electrically an ordinary mercurial thermometer, which is out in my garden, with a graduated dial placed inside the house some little distance off, in such a way that the dial will always show at any time at what temperature the thermometer is standing outside? Would it be more easily accomplished with any other form of thermometer?

Yours in expectancy,

Summit, N. J., May 28th. A. H. W. S.

ANSWER:

[It cannot be done with an "ordinary mercurial thermometer." It might be managed with a specially constructed one, and a step by step telegraph apparatus; but would be costly. The proper way is to use two wires, connected to terminal pairs of bismuth and antimony at each end forming differential thermometers, with a galvanometer graduated for the purpose.—ED. REVIEW.]

Editor Electrical Review:

SIR: I should like to ask your opinion or that of your readers as to whether a Bell telephone receiver will receive, by what may be called an intermittent current, *i.e.*, a current which is not continuous. It has been understood, generally, to work by an undulatory current. This it does do when used in connection with a transmitter (without an induction coil) when the duty of the latter is simply to act as a kind of regulator or throttle-valve to govern the current flowing out from the battery direct to the receiver at distant end.

What I am not quite clear about is the action where induction coils are used. Here we have a secondary current set up in the coil, first of all, in an opposite direction to the current circulating through the primary of coil and the transmitter; when the latter is spoken to, a variation in the strength of primary current is caused, which, if the variation be a diminution, results in the momentary circulation of a current in the same direction as that of the primary. Thus a continual series of intermittent currents, varying in potential and varying in direction, are set up, which run to line and operate the receiving telephone.

Under these circumstances, can a reversal of current take place without a resulting momentary stoppage or break in the current? If so, however short this break may be, does it not appear that the telephone will speak with a "make-and-break," or intermittent current?

I am, sir, your obedient servant,

F. H. N.

East Hampton, N. Y., May 23d.

ANSWER:

It seems to be logical to assume that in the continually reversed currents produced in a telephone line by an induction coil, that at the moment of reversal, there must be an instantaneous interval of zero.

But when the changes of current in the primary circuit are so inconceivably rapid as they are practically, the zero point in the secondary circuit is so short that it can scarcely be considered.

Moreover there is no moment when there is not a current in the primary circuit, nor when the line circuit is broken.

Editor Electrical Review:

Would you be so kind as to answer the following questions: 1. What is the reason why we cannot transmit the voice at any distance with a carbon transmitter? We have the power at hand, namely, the battery, which may be augmented at any extent? Is it because the power of vibratory movements at the sending point remains always the same, however powerful the battery may be? C.

ANSWER.

The reason is, that we cannot profitably increase the battery. If we use more than two cells, the electrodes burn. Moreover, the vibrations of the receiving diaphragm are produced not by strength, but by the variation of magnetic strength.—ED. REVIEW.

Editor Electrical Review:

SIR: I would like to get a magnet that would raise 15 or 30 pounds of iron up 100 yards or more, if necessary. Would a simple magnet be sufficient or would an electrical instrument have to be attached? If so, what one is best for the purpose indicated, and where is the best place to get it? Some one told me that a piece of soft iron with a battery attached would raise any weight to any heighth.

I have no knowledge of such things, and I have very little means, hence I am compelled to study economy. Please answer in your next issue and oblige a poor fellow.

Respectfully,

WM. SMITH,
151 E. 50th street, City.

ANSWER:

[It is not possible to construct a magnet that will attract 15 or 30 pounds placed at a distance of 100 yards from the magnet. The attractive power of a magnet diminishes as the square of the distance, and it requires a very powerful and expensive magnet to raise any considerable weight through a distance greater than 4". An electrical instrument would evidently be required. A Griscom motor could be adapted to lift the weight you speak of for any distance by winding a cord on the pulley of the motor. Cost with battery about $35. Apply to the Western Electric Manufacturing Company, 62 New Church street, New York.—ED. REVIEW.]

A Man Who Stole Electricity.

The local acquaintances of a certain volatile Frenchman who made himself a part of Springfield for a number of months, claiming to be a great inventor, but who has lately sought fresh fields and pastures new, wish that his path in life and theirs had diverged before they ever met. They claim that the first alleged invention he urged on their attention was that of a "multiplex telegraph," by which an indefinite number of messages could be transmitted over the same wire at the same time. They further claim that he had victimized prominent men in other cities before coming here by this scheme, which had been exposed by an electrician, who, having looked the apparatus over a little, discovered concealed wires, each of which carried a message of its own, while the one visible wire seemed to do all the work, but was really of no use. They go on to assert that this man claimed to be the inventor of a new electric light, and promised to light the Howard Street Catholic Church with it on a given evening about a year ago, but not one ray of any such illumination has ever been seen. It will be remembered, however, that there was a fire on the roof of the Hampden House block some months since, and it is now charged that the blaze was caused by wires which the frog-eater had run from those of the electric light company down into his room in that building. If he did try to steal electricity in that way, the attempt was not an unqualified success. His last invention an electric motor, which he said was so constructed that by turning a certain roll for ten minutes enough electricity could be generated to keep the thing running several days, furnishing valuable power all the time. The machine was set up in a Summer Street house, and a good many citizens dropped in to see it, including the manager of the electric light company, who says that he thinks it was run by a concealed battery in the machine itself. The Frenchman is understood to have once been a Canadian telegraph operator, and then a Boston hotel barkeeper, who took up the rôle of inventor as an easy method of getting a livelihood. While here he was continually getting ready to organize companies for pushing his inventions and selling per cents. It is affirmed that a countryman of his living in the city has paid him $4,000, which represents about all he had, to be applied in bringing forward the inventions, and that there are other victims, including several Frenchmen and a number of Smith & Wesson's men. The latter helped form an electric motor company, with one of their number as treasurer. This company paid a Ward 1 manufacturer for building two or three models, and the manufacturer loaned the inventor a little money, although he now says that he never had any faith in the man's inventions because he never finished anything, but began a second model before the first was done. He thinks also that the motor was run by means of a battery the man had hidden about his person.—*Springfield (Mass.) Republican.*

In the action of the Gold and Stock Telegraph Company against Charles J. Wiley, founded upon the alleged infringement by the defendant of reissued letters patent granted Junuary 25, 1870, to the plaintiffs as assignees of Edward A. Callahan, and of original letters patent granted July 27, 1871, to Henry Van Hoevenbergh, as inventor, Judge Shipman, in the U. S. Circuit Court to-day, handed down a decision in favor of the plaintiffs touching the Calahan patent. The original Calahan patent was granted April 21, 1868, and each patent is for an improvement in telegraph printing instruments particularly designed for registering the prices of stock. After reviewing the testimony, the judge orders a decree for an injunction against the infringement of the Calahan patent and for an accounting, and the dismissal of the bill so far as the Van Hoevenbergh patent is concerned.

Cross-Eyed Car Horses.

"Cross-eyed? Yes, there's something in the idea," said a Chestnut street car driver to a Philadelphia *Times* reporter, when interrogated as to the effect of the electric light on the horses. "I was raised among horses, but I never saw a cross-eyed one. Now, I don't say as these'ens look cross-eyed, but they act so. Why, when we gets down to Front street, and swings 'round to Walnut, the horses often has to be changed to the other side to prevent 'em crowding each other. Does it interfere with the business? Well, I should say it did. The two horses look for passengers on the same side, you see. Do the horses see the passengers? Yes, they are on the lookout, same as the drivers. I don't know what this cross-eyedness may lead to. Some of the boys was a sayin' to-night that John Norton, the stable boss, had to change the feed boxes of some of the horses on the night line to the off side, so the cross-eyed horses could find them. If this electric light freckles the girls on Chestnut street, it is not so queer that it injures the horses' eyes."

Our contemporary, the *Deutsche Bauzeitung*, published an article recently concerning a contract for an electric street railway, which was awarded to Siemens & Halske, under the management of Engineer Swieger, formerly of the City Railroad of Berlin. We can also say that the first designs for an electric railway in Vienna were originated by Mr. Berthold Mendel, who in 1881 talked on the subject to the Vienna authorities, and also in 1882 in Berlin. That he understands the subject thoroughly will be seen from the fact that a diploma was awarded him in Munich at the Electrical Exposition, for his lectures upon the matter. The material for the construction is now at Konigberg. The firm of Siemens & Halske, although familiar with this work, gave the construction to Berthold Mendel.

Here is one of the probabilities of the future: "A Western gentleman who likes to sleep Sunday mornings suggests that church bells be dispensed with, and, as substitutes to summon people to church, small electric alarm bells be placed in the houses of members."

Somebody who has tried it discovers that it is no use to attempt to "court" any of the telephone young ladies. The company have just placed "spark arresters" on all the 'phones.—*Commercial Advertiser.*

Telephonic.

LITTLE ROCK, ARK., June 16, 1883.

Editor Electrical Review:

Texas, Arkansas and Massachusetts shake hands.

General Manager Downes, the ubiquitous Col. J. N. Keller, and his urbanity of the American Bell, have gone and done it.

The latter could, of course, be no other than the irrepressible, and, as one newspaper reporter got it, "Inspector and Detective" J. M. Brown.

Saturday, the 9th, found this Jumbo trio laved in the sunny white-caps that kiss the grandest beach on the face of the earth—Galveston, Texas—and to say that they stood on their heads, floated suavely on the foaming billows, pirouetted on their nasal protuberances, and guffawed loudly over such mishaps as a throat full of briny liquid in no wise presents a perfect photograph of the enjoyment that reigned supreme. True, when they emerged, the sun beamed mercilessly, and their limbs were laved again, but nothing seemed to dampen their ardor for business; and the exchange, which has now reached three hundred and twenty-one subscribers, under the persistent efforts of Mr. T. W. Milburn, who took it with only two hundred twelve months ago and in almost a hopeless condition, and has pressed it to its present high standard, was examined in all its details.

The latter, with his usual modesty, but blushingly, accepted the superintendency of the Southern division, with headquarters at San Antonio, and immediateiy entered upon the duties thereof.

The next visited was the Houston Exchange, with the daisiest central office, happily located in a five-thousand dollar tower, not constructed specially for the purpose, but, like all other good things, a prey for telephonic tentacles.

Being Sunday, the manager was out.

A night's ride brought the party to San Antonio, the historical and æsthetic city of Texas, and perhaps the most prosperous in all the vast Southwest.

This exchange was taken in in all its details, when the manager was out; but it is intimated that the general manager was captivated by the chief operator—a pretty, modest girl—who directed the linemen, managed the central office, directed the stringing of wires, and spoke of putting in boxes as if it were a matter of common experience four or five times a day.

There is compensation in all things.

San Antonio now numbers three hundred and twenty-five, with numerous orders on file.

Mexican meals were eschewed, the succulent *tamale* tabooed, the "missions" missed, and the great Missouri Pacific was tackled at early dawn.

From this place to Dallas, Texas—four hundred miles—the garden belt of Texas was traversed, and all seemed fascinated with the paradisiacal panorama.

All this region is finally cultivated, and in the same fields could be seen the languid cotton plant; vast wheat stacks, cut and bound by McCormick reapers; deep green acres of growing maize, rye and barley, and oats ready for the reaper.

This wide strip is numerously dotted with small towns; a number of thriving small exchanges were passed; and here and there the "extra territorial" tarantula stretched out its arms far over the teeming prairies and into the dim horizon beyond.

But such is destiny, for all this territory is soon to be bound together and linked with the equally prosperous and profitable lines that are stretching toward it from every part of the State.

Alvarado reached, the chaperonic qualities of Maj. J. M. B. were developed in a high degree, for while the conductor was yelling "All aboard for Fort Worth," he succeeded in interviewing sundry clever cowboys, with "short-horn hats" and "bald-faced" shirts, that were posing on the platform, sent a telegram engaging rooms where they had no intention of going, engaged a team to convey the party to the village inn a mile away, rushed in, capturing his grip-trunk from the alarmed porter, and slid gently to the platform as the train rushed madly past the further end.

Ensconsed in the comfortable country quarters of "mine host," despite the gentle thrumming of a guitar, which could be heard through all the thin ceilings, and the downpouring of a mighty rain, they slept the sleep of the tired telephonist.

Dallas came next—a thriving town, with two hundred and eighty subscribers, whose manager, Mr. D. M. Clower, gracefully donned the toga as superintendent of the Middle Division.

As all letters to a scientific journal should be confined to strictly scientific topics, we will here digress.

Let not the fact of the invention, "hailing from Texas," cast a suspicion over its sincerity, for here was found a wonder of telephony.

Said the inventor, and the champagne came near changing hands, "Take down any telephone in this city, or any of the territorial even sixty miles away, and once every minute of the day you have a watch which tells you the exact time to the minute."

"You call no one; simply take down the telephone and place it to your ear. Unless told of it, you would never notice it, for it does not interfere in the slightest degree with any conversation on the wire."

Sarcastically, the G. M. bent his ear and listened, then smiled and counted—1, 2, 3, 4, 5, 6, 7, 8; 1, 2; 1, 2, 3, 4, 5.

"You see," said the former, "eight ticks, two ticks, five ticks: 8.25 P. M.;" and the G. M. hung it up with awe

These ticks are so gentle and light that unless the attention is first called to them they would never be noticed at all, but it's simple enough.

Crack the nut.

A number of managers from exchanges in the vicinity of Dallas were met, and entered heartily and courteously, as well might such successful telephonists, into the entertainment of the new management.

Among them might be men ioned the pugilistic Willis, who, after giving three warnings to deadheads, gently answered his call the fourth time, and while he is waiting for the connection softly steps around and punches his nose through the transmitter.

Little Rock was sighted late Thursday night, and early Saturday morning all hands were deep in the mysteries of accumulated correspondence; but as the generous and hospitable retiring President, Col. E H. Roots, here presides, we may safely leave the tourists to his tender care.

Little Rock has nearly three hundred subscribers, and is growing. Mr. E. K. Baker, its successful manager, receives the appointment of district superintendent, Northern District, comprising all of Arkansas and part of northern Texas.

It would probably not be out of place to mention the warm reception of the party by enthusiastic citizens of Marion, Texas, who, in their eagerness for telephonic connection, stopped the train long enough to serve an elegant breakfast, which was enlivened by a fine brass band and many happy toasts.—D.

For the REVIEW.

Ramblings in the York State Classic Region.

Leaving New York City for the classical region of the State, a more picturesque route can scarcely be found than that of the Delaware, Lackawanna and Western Railroad.

This, by means of the Morris and Essex, which it has leased, has its New York terminus at Hoboken, and communicates thence by the Barclay and Christopher street ferries with the Empire City itself.

The main line trains for the first forty miles—that is, from Hoboken to Dover—take the route *via* Paterson and Boonton, but many trains pass also over the main line *via* Morristown.

Aside from the beauty of the natural scene, which everywhere pervades this road, the most noticeable feature of the M. and E. Division is the apotheosis of the name of Morris, which is universal, but which, as might be expected, is accentuated in Morris County. Now, I don't know who the old original Morris was or is, but from the concentrated veneration in which his memory is held, I take it that he was one of the earliest saints in the Jersey system of theology. We go west from Hoboken on the Morris and E-sex Division, and if we take the main line, after riding thirty-one miles or so, we come to Morristown, which is a beautiful place and renowned for two things—first, it is one of the nine hundred and ninety-nine headquarters of Washington; and second, it was the home of Alfred Vail, who was the early partner of Morse.

One of the principal streets of Morristown is Morris street, and Morristown is the county town of Morris County.

Between Hoboken and Morristown several special trains are run, which are called the Morristown specials. The last time I rode on these trains one of them was drawn by an engine called the "Morris," which engine was managed by an engineer who also bore that noble appellative.

Two miles further west is the station of Morris Plains, where the big New Jersey lunatic asylum is located; while still further west is Port Morris, a harbor of refuge and a port of entry on the raging Morris Canal.

It will be seen that there seems to be no immediate danger that the good old name will die out.

The road-bed of the D., L. and W. is superb, and we sped smoothly along, occasionally making a spurt of sixty miles per hour.

There was, however, evidently a Jonah on the train, for repeatedly the train was forced to stop at unscheduled stations, for the purposo of cooling and lubricating that *bête noir* of railroad traveling, yclept a "hot box;" and the hot box seemed to be epidemic, for now it was the engine, and shortly after a palace-car, and so on; and we consequently lost time in a well regulated and systematic manner.

Veracity compels the statement that, wherever we were scheduled to stop, the business was done most expeditiously, the very boxes delivered from the baggage car apparently having, by induction, become infected by the prevailing epidemic, and graduated in due course as "hot boxes." I did not touch them to find out, but judged such to be the case from the remarkably eggish and gingerly mode of handling them adopted by the baggage men. The train, in due course, sped through the Delaware Water Gap (a huge notch in the mountains, through which the Delaware finds its way to the sea), and here the route became so circuitous that, after we had left the said gap behind us by about forty-five minutes of rapid transit, we discovered it again a long distance off, actually ahead of us on our port bow.

At this moment an inquiring young man, who had been wanting to know something ever since we left Hoboken, asked an apparently well-informed but profane and crusty fellow-traveler, what was meant by the cabalistic letters D, L. and W. which are painted on so many cars. The crusty and profane *f. t.*, however, could not at first credit the ignorance of the young man, but when he did, being already somewhat enraged by being late, he growled out the following: "I 'spose it stands for D——d Long and Winding Railroad."

In due time, and after many miles of ascent, the train arrived at Scranton, where some of us partook of a dinner, which, though not good, was not bad. The face of the country about Scranton appeared to be about as fertile as Arabia Petrea, but possessed one redeeming feature, in the numerous wild laurel bushes, all in full flower, which might be seen in every direction.

Descending the hill once more, into the State of New York, the country improved, and we were soon surrounded by a pleasantly-rolling agricultural district, which continued to improve until the train arrived at Syracuse, between seven and eight in the evening.

No one who has read much in classical history can fail to recall its geographical localities during a trip through the State of New York; for here you may find Troy, Rome, Utica, Carthage, Ithaca, and Syracuse, within a comparatively small radius. I had almost included Ogdensburg and Fayetteville in the above list, but recollected in time that the ancient Greeks and Romans were never such Goths and vandals as to have any *villes* and *burgs*. They haven't much to their credit, but when they do score a point let them have it, by all means. And so these delightful memoirs flowed in upon me as I cast anchor in the good city of Syracuse.

Was it not at Syracuse that specific gravity was first discovered? Was it not at Syracuse that Archimedes said, "If he had but a place to stand he could move the world with his lever"?

We moderns do better than that. We can move the world with our levers of steam and electricity, even without a place to stand.

Syracuse, N. Y., though it cannot boast of an Archimedes, has yet many advantages. It has three railroads, and another one coming, besides the Auburn branch of the New York Central. It has, moreover, a number of good hotels, nine banks, forty-two churches, a big lake, and a great number of salt mines. It is, indeed, the largest salt market in the United States.

The population of Syracuse proper is 57,632, and including the suburbs it aggregates 65,132.

Many solid and magnificent buildings are to be found here, and one of the finest is the fireproof building of the Onondaga Savings Bank.

The Syracuse Telephone Exchange Company is practically the successor of the American District Telegraph Company of Syracuse, and the latter title is still the proper name of the corporation. The messenger business continues to be attended to, although much overshadowed by its robust young rival, "the Telephone Exchange."

The central office is located commodiously in the top story of the Savings Bank building. It originated in 1879, and its organization is as follows:

President, C. E. Stevens; Treasurer, M. J. Myers; Manager, M. Jervis Myers; Superintendent, W. H. Girvin.

When this exchange started, it had but a few subscribers, and its lines were all battery worked; that is, a battery was always kept on the line, and to signal the circuit was broken by pressing a key.

Many of the lines are still so operated, it having been the conservative policy of this company to avoid radical and sweeping changes. Over half of the lines are now fitted with magneto bells at the subscribers' stations, and almost all new subscribers are so arranged.

The central office switchboard deserves notice, as having been entirely made at home and by the company's employes. Although not elaborate, it is practical, efficient and simple, consisting of two sets of transverse bars, which are plugged together when two lines are to be connected. The calls are received on shutter drop annunciators.

About 220 lines enter the central office, while others are constantly being built. One hundred and fifty of these have but one subscriber, the remainder having from two to nine sub-stations, the total number of subscribers being about 535.

There are some very fine pole lines here; one immense pole, carrying no less than seventeen cross-arms, nearly every cross-arm supporting twenty wires. Seven more cross-arms are still to be placed upon this pole. Not many long lines radiate from Syracuse, the longest being to Manlius—11 miles. The reason of this is that there are no other very large cities with which Syracuse would do an extensive business, itself being a center of a considerable agricultural district. Considering the size of the place, a great many Universal Edison transmitters are here retained in use, while the Edison is altogether used in the central office.

Take it altogether, Syracuse has a favorable specimen of the telephonic exchange—one that is giving good satisfaction, one that is ably managed, and one that we prophesy will greatly increase in the next few years. And although still unconnected by the tele-

phone wire with the outside world, it cannot long be without facilities for talking with Utica, Oswego, Rochester and Auburn.

Oswego is located on the south shore of Lake Ontario, thirty-five miles north of Syracuse; it is bisected by the Oswego River, which, by its mouth, forms a good harbor, and also is connected by canal with the Erie Canal.

Oswego is a port of entry, and carries on an extensive lumber trade with Canada It also has a considerable starch manufacture, the odor of which, much resembling boarding-house cabbage in character and intensity, is prevalent throughout the city.

The Oswego telephone exchange is owned by the Empire State Telephone Company, of New York; H. L. Storke, president.

The central office is favorably located in the upper story of the Rome, Watertown, and Ogdensburg Railroad, and the manager of the exchange is Mr. J. R. Pierce, who has been most successful in creating a good business out of poor material. He is ably assisted by Mr. F. A. Chadwick, to whom is intrusted all the electrical work, construction and maintenance. Associated with the latter gentleman in all important work is Mr. Joyce, who, although he is permanently in charge of the wires of the R., W. and O. R. R., finds time to assist in the operations of telephonic construction.

Both gentlemen are enthusiasts in applied electricity, and very ingenious and practical in their ideas.

The actual work of the central office is carried on by two young ladies, one of whom also officiates as book-keeper. The entire population of Oswego is, in round numbers, 24,000, and the number of telephone subscribers is one hundred and fifty-five. A sub-station is located at Fulton, N. Y., a town comprising five thousand inhabitants, with thirty-two subscribers.

The Oswego exchange employs the well known "Law" system, in which the subscribers, in addition to being connected with the central station by private wires for intercommunication, are also provided with what is called the signal wire. This is constituted by a wire which is grounded at the central station through a telephone and transmitter, or a relay call, as desired, and which taps into the subscribers' stations. The orders for interconnection are transmitted of this line. This system admits of the use of a very simple switchboard, consisting merely of a few connecting bars and a battery plate. The lines, which are nearly all supported on poles, are built of No. 14 steel wire, and consist of one hundred and forty-eight wires operated on the "Law" system, and eight annunciator wires.

This exchange is well managed, and gives first-class service.

The only long line is one to Fulton, one hundred and twelve miles.

VERITAS.

The Chinese Telegraphs.

HONG KONG, May 16.—The Chinese Government has issued an edict to the effect that the telegraph lines from Woosung to Shanghai and from Amoy to "Hoihon" shall be built by the Chinese alone. The Great Northern line will only connect up to a point contiguous to the outside ports.

Another Field for Telephone Investment.

The Lowell telephone syndicate have secured control of the American Bell Telephone Company's rights in Cuyhoga county, Ohio. The company's center of business is at Cleveland. There are at present 1,500 subscribers. The contract with the mother company has seven and one-half years to run. Cleveland, with a population of over 210,000, is the center for the exchange of produce of Ohio, and the West for the manufactures of the East, and, as may be readily seen, is one of the most promising telephone fields yet purchased by the Lowell syndicate. The capital of the company is $1,000,000, and the shares have a par value of $100.

General Manager J. E. Zeublin of the Philadelphia Telephone Company publishes the following letter to the select council of that city:

Before final action is taken upon the amendment to the bill granting privileges on city poles to the Philadelphia Bell Telephone Company, introduced last Thursday, permit me on behalf of this company to call your attention to its injustice, and demonstrate to you its prohibitory effect in depriving thousands of citizens of the comfort, convenience and protection of the telephone in their homes.

We have only asked for like privileges granted to every telegraph and electric light company, foreign and local, that has ever entered this city.

We agree to pay the same high rate of taxation, and thus largely augment the city's revenue from that source, although our wires cause infinitely less strain upon the poles and weigh much less than those referred to.

In addition to what you exact of them, you require us to furnish 27 telephones to the various city departments and offices, to connect them with the general system and to employ operators to attend to that service without cost to the city. To this we will not object, if the city will furnish the necessary wires upon its poles without cost to us, for this service.

You allow us this pole privilege for the brief period of 18 months, when, by a law of your own making, we are compelled to place our wires underground at another and greatly increased expense.

We have asked this particular privilege in order to introduce telephones into the residences of Philadelphia at the low rate of $60 per year.

Each subscriber to be connected with the 2,500 subscribers to the general exchange, and with the police and fire departments, enabling him to thoroughly protect his property under all circumstances, without risking his life or leaving his hearthstone.

For this you make an annual charge of 50 cents per pole for each wire and a mileage tax of $2 50 for each mile of wire, aggregating $2.50 per mile, or three times the original cost of the wire; or, reckoning thirty wires to the pole, the number we would doubtless average, five times the original cost of the pole.

With this average number of wires upon the city poles the city would derive an annual revenue of $60,000 for attachments and $7,500 for mileage, or $67,500 in addition to the tax now paid.

Philadelphia stands alone to-day as the only city in the United States that has not assisted in the development of its local telephone company by granting to it liberal pole and wire privileges.

It is the only city that has baffled telephonic growth by unreasonable restrictions.

It is the only city in which the residence telephone service is undeveloped.

It is the only city in which the telephone has been refused pole privileges.

It is the only city in which privileges on city poles have been denied.

It is the only city that levies an onerous tax upon this industry.

It is the only city that has demanded free service for all of its officers, and the right to regulate the charges of a private enterprise, developed entirely and with preëminent success without public aid.

We come to you respectfully and frankly and say to you that we cannot extend this service to the residences of this city at the low rates offered by us, unless we have the right to use the city's poles until a feasible and reliable underground service is developed.

We object to the attempt to regulate our "residence" and "office" rates for the following reasons:

1. Our rates, as shown by the annexed official comparative table, are now lower than those of the three leading telephone cities of the United States—New York, Boston and Chicago - the only cities with which a fair comparison can be made. In all of which free pole privileges are enjoyed.

2. Our rates are relatively as low or lower than any city with a population of 150,000 inhabitants.

3. A reliable and satisfactory residence service cannot be furnished with any profit to the company at a rate less than $60 per annum where such a tax is imposed.

4. Limiting the number of calls and charging for extra service, as provided in the amendment, has been repeatedly tried in our commercial cities and abandoned. In Boston it caused a withdrawal of 50 per cent. of the subscribers within three months.

5. Because our business service is already covered by satisfactory and expensive fixture routes on house-tops, through private arrangements made with the owners, your poles in that direction being useless to us, as the induction from the electric light wires upon them compelled us to abandon them some months since, in order to work our business circuits.

6. The new system requiring an extra and expensive wire run into all subscriber's offices for which the companies are charged an additional royalty, has, on account of the increased expenses, been introduced in New York and Philadelphia only. The rate charged in the former city is $210 per annum, and but $120 in the latter, which is the same rate charged for the old system in Boston and less than exacted in Chicago.

Telephone experts who have visited every exchange in this country acknowledge that Philadelphia has the finest system and promptest average service in the United States.

Facts demonstrate that at a reasonable rate we cover a larger area, with more impediments, with a greater population, than any exchange in the country, and we feel that it would be very unjust to tamper with our present and promised rates while a heavy tax is levied, and the additional and unknown expense of underground service is so nearly upon us.

We beg of you, gentlemen, not to be misled by clamor or the sophistical and unwarranted statements about our profits, or to continue to confound us with the American Bell Telephone Company, of Boston, the parent company, from which we lease our telephones, and the small territory that we operate, exclusively in Philadelphia, but to treat us solely and impartially upon the merits of our contemplated service and the reasonableness of our request.

That oil and water do not mix is a well-known fact.

Yet something very like an attempt to force a combination of as widely-diverging and antagonistic elements has been going on for a considerable time past between the big telegraph company and the little district company, that was made part and parcel thereof about a year or so ago.

The plan seems to have been an excellent one, as originally laid out, but practically it has not brought about the result that was anticipated, or that might at first glance have been reasonably enough supposed to follow.

When the wheels of a coach are wanted to revolve smoothly and with little, if any, friction, the axle is well greased.

And this has the desired effect in practice.

It would, however, be considered a very absurd proceeding if the same thing was attempted to be accomplished by filling the pockets of the driver with the lubricating material.

Nevertheless, an arrangement bearing a striking analogy to the above, in some respects, is now in operation, in the working together of the two companies already spoken of.

As a matter of fact, they don't work together (in harmony, at least,) at all.

Not as it was confidently expected they would.

And, still further, the difficulty is now a pretty apparent one, and not a hard one to remove, either. Will it be removed?

While the big officers of the large company have become also the big officers of the small company, and consequently produce smooth and easy movement in their departments, the smaller officers—namely, the superintendent and inspectors—of the lesser company are still retained as before.

In addition to this, while many of the larger offices are still conducted under separate management, each manager being brought in direct contact with his old and legitimate superior officer, many of the smaller ones were never consolidated under one manager, he invariably being the man of the old company.

The case now stands this way:

Here are men of many years' experience, and standing in their own service, with the best of records, suddenly made subordinate to people with whom they have heretofore been, ever since the establishment of the district system, it may be said, at variance.

They are expected to take a sympathetic and brotherly interest in (at a moment's notice, almost,) a something that they have been at continual warfare with for years past.

This is neither fair nor just, and the fable of the ostrich hiding its head again protrudes itself.

We who are at the helm of the concern say that you must work in harmony, so there is no reason why you can't

All the same, they don't, and they never will until the remnants of the useless and now entirely unnecessary form of a distinct and separate superintendence is wiped out of existence.

The sooner this takes place the better it will be for all parties.

The systems of the two concerns are radically different.

One has always been a small, petty, tyrannical, suspicious, not-to-be-trusted organization, where most every one's principal duty consisted in watching someone else, or in manufacturing foolish and silly rules for those who were considered utterly unworthy of confidence or trust.

Perhaps they were so originally, and if they were not, they were sure to become so eventually under this kind of treatment, if they remained long enough under its influence.

It will readily be seen that, while the greater liberty of action now given to such men is, of course, not understood by them or put to its best use, on the one side, the restrictions, the espionage, the never-ending and petty fault-finding course pursued in the other case tends to make the old breach still wider, and instead of bringing about a union of interests and a harmonious whole, the antagonism in the working force is greater than ever.

In fact, attempts at removal have been made of men who have been telegraphing years and years before the district system was ever thought of, and who are, in addition in every way competent and reliable, but who objected to be used as foot-balls at the whims of superiors, so called.

Let the work that is now half done be completed.

The superfluous heads abolished, and the men whom it has proved necessary to watch gradually weeded out.

When this is done, the end sought to be reached by the unification of the two companies will, perhaps, be an accomplished fact, and until then the trouble may continue.

Death of General Charles Ewing.

General Charles Ewing formerly of Ohio, died at his residence in Washington shortly before two o'clock on Wednesday morning, the 20th instant. He was a brother of General Thomas Ewing, of Ohio, and a relative by marriage of General Sherman.

General Ewing was born in Ohio, and studied law, but on the breaking out of the war entered the regular army as Captain in the Thirteenth Infantry, having previously received military instructions from General Sherman, with whom he lived in St. Louis. He served through the war on Sherman's staff, was brevetted Major in 1863 for services at the siege of Vicksburg, brevetted Lieutenant-Colonel in 1864 for services in the Atlanta campaign, and again in 1865 was brevetted Colonel for gallant and meritorious service during the war. He resigned in 1867, and since then has practiced law in this city.

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We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

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He Laughs Longest Who Laughs Last.

M. Tissandier's project for the construction of a flying machine seems to be furnishing some of our contemporaries with no end of amusement. We are much mistaken in our estimate of the character of M. Tissandier if he is at all disconcerted by this unmannerly buffoonery.

As we have said before, we do not propose to prophesy either success or failure to any undertaking. We rejoice, however, that the project of ærial navigation is attracting that attention which its importance warrants, and especially are we pleased that so able a mechanician and so practical a man as M. Tissandier is devoting himself to the subject.

As is well known, Tissandier proposes to use the storage battery to furnish his motive power; and such application being entirely new, many preliminary failures are likely to be scored before a possible ultimate success can be assured.

A few wild blunders and risible absurdities, from which no work of such multiplicity was ever free, may for a time furnish folly with laughter, and harden ignorance into contempt. But perseverance, ingenuity and intelligence will tell in the long run, and, even though Tissandier should only succeed in proving that aerial navigation, under such conditions as he is now working, is impracticable, he will have rendered an important service Should he succeed, he may be sure he shall not want for celebrators of his victory.

When *Coriolanus*, in Shakespeare, deserted to Aofidius, the Volscian servants at first insulted him, even while he stood under the protection of the household gods; but when they saw that the project took effect, and the stranger was seated at the head of the table, one of them very judiciously observes that he "always thought there was more in him than he could think."

A projector often unites those qualities which have the fairest claim for veneration, extent of knowledge, and greatness of design. Projectors of all kinds agree in their intellects, though they differ in the means they employ When they fail, it is by attempting things beyond their power, by despising vulgar attainments, and aspiring to performances to which, perhaps, nature has not proportioned the force of man. When they fail, therefore, they fail not by idleness or timidity, but by rash adventure and fruitless diligence.

That the attempts of such men will often miscarry, we may reasonably expect; yet from such men, and such only, are we to hope for the cultivation of those parts of nature which lie yet waste, and the invention of those arts which are yet wanting to the felicity of life. If they are, therefore, universally discouraged, art and discovery can make no advances.

Whatever is attempted without previous certainty of success may be considered as a project, and amongst narrow minds may therefore expose its author to censure and contempt; and if the liberty of laughing be once indulged, every man will laugh at what he does not understand, every project will be considered as madness and every great and good design will be censured as a project. Men unaccustomed to reason and researches think every enterprise impracticable, which is extended beyond common effects, or comprises many intermediate operations. Many that presume to laugh at projectors or designers would consider a flight through the air in a winged chariot or flying machine, as the dreams of mechanic lunacy, and would hear with equal negligence of the union of the Atlantic and Pacific oceans at Panama, Nicaragua, or Tehuantepec, and the scheme of Albuquerque, the viceroy of the Indies, who, in the rage of hostility, had contrived to make Egypt a barren desert by turning the Nile into the Red Sea.

Those who have attempted much have seldom failed to perform more than those who never deviate from the common roads of action. Many valuable preparations of chemistry are supposed to have risen from unsuccessful inquiries after the grand elixir; it is, therefore, just to encourage those who endeavor to enlarge the power of art, since they often succeed beyond expectation; and, when they fail, may sometimes benefit the world even by the failure, since it will deter others from engaging in a fruitless search.

The Control of the Telegraph.

The wise man has said, there is a time to every purpose under heaven. In the enunciation of the vicissitudes of human affairs and the varieties of conduct, he has recounted a time to be silent and a time to speak.

We have refrained from taking part in the discussion, which for some time has been in progress, regarding a one-man power in the telegraph service—first, because while the popular writers were in the heat of the discussion we never had an opening to speak; and, second, because we never saw in them the disposition to listen. But now, when the calm which usually succeeds the storm has set in, it would seem a fitting opportunity for a journal devoted to electrical subjects to take a dispassionate view of the situation.

It is the policy of an independent journal, like the ELECTRICAL REVIEW, which owes allegiance to neither corporation nor individual, to treat all fairly, from the great syndicate to the humblest electrician or experimenter.

Following this policy, we have frequently said that we could see no impending danger to the public interests in the fact that the telegraph system of the country was controlled by a single corporation composed of intelligent, responsible and reputable men, such as those at the head of the Western Union Telegraph Company. But recent events have demonstrated that a single speculator, who some time since secured the nominal control of that company, is by no means willing to refrain from meddling with its practical working, as we were led to believe he would be, and therefore it is our bounden duty to point out the dangers of such interference.

Jay Gould is one of the most extraordinary stock manipulators known to the history of Wall street. He is something more than a stock operator. He is capable of projecting great schemes, and of executing them. From the time he so involved Charles Leupp in leather speculations as to cause him to commit suicide up to the great telegraph consolidation, Jay Gould's career as a speculator and organizer has been unenviable from a moral standpoint, though amazingly successful.

But his feat of uniting all the telegraph companies under his own management involves consequences so important that it deserves to be considered from a public point of view. If Mr. Gould were the best and purest of men, the power vested in his hands by the consolidation would be so vast that the country might justly fear that it would be abused.

Look at the situation! The whole telegraph system of the country is in the hands of this one man. Every officer and operator, from the president down to the workman who repairs the wires, is as absolutely subordinated to his will as are his house-servants. One man to-day stands between the sender and receiver of every message which goes over the wires. He can, if he wishes, know every family secret, as well as the most secret confidences between friends. All news, public or private, is subject to his inspection and manipulation.

Now, if he were dishonest, what a world of mischief he could accomplish. That Mr. Gould professes to avail himself of his privileges is rendered probable by the semi-official notification made public some time since that cipher messages would not be received. It is in his power to make such an edict and to put it in force. Such action on his part is no more incredible than was the consolidation itself, or the fact that 50,000,000 of people will submit to this one man's power. It would not be tolerated in any other country.

Were he so inclined, Jay Gould could trade upon family secrets and business confidences. Were he inclined to use his power, every material interest of the country would be at his mercy. All the news of the world pours through avenues which he commands. If he so wills, the telegraphic service can be so ordered that his agents will report to him before the information is given to the world, and this would give him an advantage over every one doing business in the United States. If Jay Gould were a rascal, it would be in his power to destroy any rival in business, for telegrams might be delayed or missent, and for that there is always a ready excuse.

Suppose some morning the news of the market was delayed. It might be announced that the cable was out of order, and there had been a breakage or an interruption of some kind. Suppose, further, that, when communication was restored, it was discovered that there had been a great change in prices, and that some one had been buying or selling to his own great profit. Jay Gould might do this—if he were a rascal. Suppose, further, that news should come of a heavy break in prices—say, of cotton, wheat or provisions—and then suppose that it should be discovered that the quotation was a false one. It would be easy to charge this to a blunder of some subordinate or to an error in the signals.

The lesson of all history is that irresponsible power is sure to be abused. The annals of nations will be searched in vain to find another instance where one man was entrusted with authority to furnish all the news to a great nation.

Deceptive Questions.

A writer to a morning journal, and whom, by his signature and address, we take to be a professor in a college not far distant, complains that he has repeatedly, though in vain, asked in the columns of scientific journals for information as to the horse-power of locomotives. If his pen and ink hold out, he may continue to do this with the same result for an indefinite period.

The fact is that the power of a locomotive engine is not estimated in horse-power at the present day. If the correspondent had asked for the power of a railway engine in tractive force, the information might easily have been furnished him.

The horse-power exerted by a locomotive attached to any given train varies with the speed, the pressure, the cut off and the resistance. The constructor knows that certain cylinder capacity, with a given pressure of steam, will give him all the power he needs, and what he is concerned with is how much tractive force he will be able to get with the available adhesion. Gradients, curves, and the condition of the road have to be taken into account. Tractive force, in fact, is the "horse-power" of a locomotive.

Such questions as this may be of value in an examination paper in a college, but no locomotive engineer would think of putting it in that form to a pupil. It is the opinion of many, ourselves included, that such questions do more harm than good, because the "practical" man is apt to sneer at the "knowledge" of the examiner; and if put at a technical college, such, for instance, as the School of Mines, they serve to lower the teacher in the estimation of his pupil.

Indeed, the character of many of the questions contained in some of the examination papers that have been made public has been justly criticised of late. We have before us an examination paper on magnetism and electricity. Some of the questions propounded therein are so misleading that we doubt if they could be answered by even a small percentage of the best-known electricians. The examiners would seem to think that the more difficult and vague the question the more does it test the ability of the student, and the more does it test his capability of turning his knowledge to a useful account. Not a few of the questions in this paper are of the purely catchpenny order, and there are others which the examiners themselves could not answer in a satisfactory manner.

The sole purpose of an examination is to ascertain the exact amount of the pupil's knowledge, and the character of that knowledge; but some papers seem set with the deliberate purpose of puzzling the student, and compelling him to waste time in an endeavor to ascertain what can possibly be the meaning and object of the framer of the question.

Practical men will agree that the contrary should be the rule; that the questions should be as simple and direct as possible; that no attempt should be made to throw a pupil off the right track, in order that he might gain the more applause by seeing through the device.

The professor, whose complaint to the press furnished us the text for these comments, if professor he be, belongs to a large class of more or less learned men, who have become so used to puzzling their scholars, that they prove the fallacy of their own system by evincing an inability themselves to put a straightforward question, or to reduce things to their simplest forms. The complainant in question reminds us of the man who, signing himself "Anxious Inquirer," wrote to Mark Twain's paper: "A friend of mine says America was discovered by Alexander Selkirk—I say it was not—which is right?" and was answered: "You are right; America was *not* discovered by Alexander Selkirk."

Electrical Notes.

The Swan incandescent light is attracting much attention hereabouts.

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I am not at all surprised at this, for it is a most efficient lamp, and the wonderful success it has met with in England gives good assurance of a like reception in this country

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The most important requisite in incandescent, as in other lighting, is a good lamp, and, as we all know, it is the most difficult to attain.

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A good evidence of this may be found in the fact that, while there are many efficient generators to be had in England, yet only one lamp (the Swan) has come into extensive use in that country.

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There is, I know, an incandescent lamp of American manufacture, but this, though possessing many good qualities, could not—or, at least, has not been able so far to compete with the Swan.

***

A report issued from the French company, dated March, 1883, gives a list of all the installations of the English company, and the total number of lamps does not amount to 9,000, a surprisingly small record, surely.

***

The Brush company, which supplies the Swan incandescent light, determined to reorganize the lamp works so that lamps of regular and uniform quality, of great endurance, and indued with a capability of sustaining a high degree of incandescence, might be produced.

***

Abandoning the bass-broom fiber advocated by Mr. Lane-Fox, they have adopted prepared cotton thread as the material of their filaments.

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The Maxim incandescent light is also making rapid strides in the popular favor. Like the Weston arc light, it is being extensively introduced by the United States Electric Lighting Company, and if the testimony of those who are using it may be relied upon, it is showing itself capable of doing what has been promised for it.

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All sorts of remarkable things have been promised for electricity. Light we have; power and heat are to come, and even sound is to be transmitted in the future.

***

But I have discovered a new electrical phenomenon, and though I herewith make it public before taking out letters patent, I hope no one else will say that he too has discovered the same thing; and I hereby indignantly deny, in advance, the claim that I'm sure—judging from the past—will come from England, that the same phenomenon was discovered there early in the present century.

***

Without further circumlocution, I will come to the point. A series of careful observations has proved to me that the electric light sometimes affects the human mind.

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Champagne exhilarates for a time, but the subsequent reaction leaves the subject at a lower level than before its use. Electrical exhilaration, if I may coin a term, has, on the contrary, no relapse; its effect is perennial.

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This peculiar affection rarely attacks the proprietors of electric light patents or inventors and projectors. Employes are the only ones, so far, in which I have noticed the germs of this malady.

***

And not all cla-ses of employes are thus affected either. It is usually only those who are wont to sign after their names "electrician" or "mathematician," or possibly office of the "World-Without-End Electric Lighting Company," or the "Fountain of Perpetual Youth Isolated Light Company," and so on.

***

When a young man is promoted from the somewhat unremunerative position of office boy to that of mathematician or officer of an isolated light company, for example, and begins to handle figures instead of cuspadores, and wields a pen instead of a broom, it requires a sound mental balance to restrain him from wearing a bee in his bonnet, so to speak. If he is seized with electrical exhilaration, as is not infrequently the case, he will at once wear eye-glasses, perhaps spectacles, walk with a firm and decided step, and assume a grave and somewhat austere aspect.

***

Happening into the office of the company upon business with the President about a year ago, I found myself in the presence of this young man.

***

He wore spectacles at this time, and had a profound, rapt air about him that savored not a little of the cloister rather than of the active business in which doubtless he was engaged.

***

He gave some orders in a somewhat solemn tone to the office boys, and then sat down at a desk and looked gloomily at a paper which lay before him.

***

I tried to get within the focus of his observation, but found that it was trained to take in nothing within a radius of some miles.

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A happy thought struck me. Perhaps if I climbed up on a piece of furniture near by, I would, as one might say, loom up on his horizon and thus get within his range of visibility.

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Before I had an opportunity to put this into execution Mr. Brown looked up at me with the air which I can imagine a lion assumes when he gazes at a contemplated victim.

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Mrs. Harriet Beecher Stowe has said that she never felt so humble, so insignificant as when in the presence of an hotel clerk.

***

I must confess I never felt so insignificant as when in the presence of this officer of the isolated company.

***

When I first caught his glance I was about to stammer out: "Will your Holiness allow me to——" when I recollected that the title "Holiness" was only used in addressing the Pope, and was about to change it to "Your Majesty," when the man I wanted to see came in, and observing that he, though a higher officer than His Imperial Highness, Mr. Brown, and weighing more ounces to the pound than the latter, was nevertheless much less austere and far more affable, I at once transacted my business.

***

But I noticed that Mr. Brown whenever he had anything to say to one of his senior officers invariably whispered, and I was interrupted at several points of my interview with the President of the company by this person, who stopped our conversation in order that he might whisper into the unwilling ear of my companion.

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At first I was led to believe that a conspiracy was afoot and looked about for the best means of effecting a convenient exit, but later on I discovered that it was only one of the consequences of electrical exhilaration which, it would seem from this, effects the manners as well as the appearance of the patient.

***

All young and rising electricians should beware of this malady, for, like ambition, it grows with what it feeds on, and to a mind like that of Mr. Brown of the isolated company, predisposed to weakness, the traces of the malady when once firmly established can never be entirely eradicated, and though Mr. Brown will know very much less some years hence than he does at the present, he will never, owing to the peculiar effects of the complaint, of which he is a sufferer, be led to realize the great dimensions of the library that might be established were he to write a faithful account of that which he knows nothing about.

***

Every now and again, we hear of wonderful inventions, which we find, upon investigation, are really only improvements or adaptations of some long-forgotten idea. Vastly improved, no doubt, in many cases, but yet having the same general plan.

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And when these similarities of the new to the old are discovered and pointed out, it frequently happens that no one is more astonished by the discovery than the later inventor himself.

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Take, for instance, the steamboat, as being the original inventor of which Robert Fulton gets almost the entire credit. History shows that boats were propelled by steam years before Fulton's first steamboat was placed on the Hudson.

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The same can be said of Morse and the telegraph, of Stearns and the duplex telegraph, etc.

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These and many similar inventions were outlined years before those who are now credited as being the inventors were born. All of which goes a good way in proving the truth of the old saying, "There is nothing new under the sun."

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Thus, as we peruse some scraps of ancient history, and occasionally come across the description of an old method of doing a certain thing, it is not strange that we sometimes begin to think we recognize an old acquaintance, or rather, perhaps, a young acquaintance in a very old dress. And, as we read on and notice more and more points of similarity, the belief grows to conviction, and we are ready to assert that this must have been young So-and-so when he was very old.

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For an illustration of this point, and to give our thoughts a practical turn, let us consider one of the methods of telegraphing employed by the Greeks ages ago, and see if we can trace any analogies between it and the modern printing telegraph.

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The old Grecian mode of telegraphing referred to was described in a recent number of this paper. It consisted of towers built on eminences as far apart as practicable. In each of these towers were placed vessels of an equal size, on the sides of which the letters of the alphabet were arranged one below the other. These vessels were filled with water, and each had a faucet at the bottom of equal discharging capacity.

***

At night, when a station wished to send a message, a flaming torch was raised aloft, which, when seen by the distant station, was answered in a similar manner, and, upon another signal being given, each station opened a faucet. When the water had fallen to a desired letter, the torch went up again, the faucets were closed, and the letter recorded.

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Thus, by repeating this operation as often as necessary, a message could be spelled out, but it must have been a slow and tedious process indeed. One ordinary d. h. message of those days would have kept the primitive telegraphists toiling the greater part of the night.

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The Hughes printing telegraph, and the Phelps in America, are probably the most successful of their kind. The main principle of these systems is somewhat alike. The printing telegraph is, perhaps, more mechanical than electrical in its arrangements, and its mechanism is somewhat intricate, but, briefly, it is operated as follows:

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At the sending end we have a wheel revolving at a certain rate of speed, which is regulated by an electric governor. To the axle of this wheel is attached a small piece of metal, which is termed a chariot. This chariot revolves immediately within a circle composed of small keys or cams. Each of these cams is connected mechanically with a certain letter, figure or punctuation mark on the sending keyboard. When any one of these keys on the board is depressed, it pushes its connecting cam slightly forward, bringing it into the orbit of the chariot. When the chariot, in the course of its revolution, reaches the cam, it is compelled to ride over it, and in doing so it closes the electric circuit. The chariot makes about 180 revolutions per minute.

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At the receiving end there is a similar wheel, revolving at a rate of speed exactly in unison with the wheel at the sending end. Connected by proper gearing to this wheel, there is a smaller wheel, on the edge of which are the letters of the alphabet in rotation, and figures and punctuation marks, corresponding to the letters, etc., on the keyboard at the sending end, and all kept inked by means of proper apparatus.

***

A strip of paper is carried past this type wheel as it revolves. Now, as the sending and receiving wheels are revolving at a uniform rate of speed, it will always happen that when a certain key is depressed at the sending end, and its corresponding cam is projected within the circle, at the moment the chariot reaches the cam, at that instant the letter on the wheel at the receiving end corresponding to the one depressed, will have reached a point directly opposite the paper, and as the chariot closes the circuit at the instant of passing the cam, a magnet pushes the paper against that letter and its impress is left thereon. Thus, as words are spelled out by depressing the appropriate letters on the keyboard, they are reproduced at the distant end.

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By this system over 60 words can be transmitted in a minute, and as many as 800 messages have been sent in a working day of nine hours. This is almost double the amount of work that can be done by the Morse telegraph in the same time.

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Now, of course, the analogy of this system to the old Grecian method is not startling; but noting the requirements of unison in each case—in the one a uniform falling of the water, in the other the revolution of the wheels—and if we call the wheels at each end the vessels, the cams the letters on the vessels, and let the revolution of the chariot correspond to the falling of the water, a certain likeness may thus be seen.

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The new steam yacht, Atlanta, owned by Jay Gould, is lighted with the Edison electric light. An "I" dynamo is used, furnishing one hundred lamps. The power is derived from a 6½"x8" Armington & Sims Co. engine. It is only a question of time when all ocean steamers, ironclads and men-of-war will use the incandescent light, thus doing away with the heat and smell of oil.

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The report of the auditing committee of the Telegraphers' Aid Society, for the quarter ending June 7, 1883, shows the society to be in a prosperous condition.

During the quarter $148 80 were disbursed in benefits to sick members, etc. Receipts for the same period, $198.50, leaving a surplus for the quarter of $44.70. Total balance cash on hand, $410.46. There are now 130 members in good standing. The headquarters of the society are in 195 Broadway. All persons engaged in electrical pursuits in New York City are eligible to membership. President, Mr. E. C. Cockey. Secretary, W. Maver, Jr.

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Captain S S. Totten, of the Delano-Haines Company, arrived from the City of Mexico on Monday last. The Captain reports great progress in the mining field since the first of

the year, and also says the telephone business is on the boom there.

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We have frequently had to notice, lately, installations of electric lighting, principally by incandescent lamps, on steamships. This innovation is spreading more and more, for reasons easily understood, for on ships this mode of lighting presents marked advantages over the use of the ordinary petroleum oil lamps. There is no longer any production of injurious gases, and the heat produced is very moderate, constituting two essential conditions for comfort in the restricted spaces of the saloons and cabins of a steamship. Besides, the motions of the vessel in rough weather have no effect on incandescent lamps, and render unnecessary all the special modes of suspension ordinarily used. One of the latest vessels on which the installation of the electric light has been made is La Normandie, now in the docks at the port of Havre. One of our correspondents in that city sends us the following interesting details of the installation:

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La Normandie is a fine packet-ship recently constructed at Barrow for the Compagnie Générale Transatlantique by the Barrow Shipbuilding Company. It is 465 feet long, and has a displacement of 9,600 tons The engine develops 7,000-horse power, and attains a speed of 19.8 miles per hour.

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The ship is entirely lighted by electricity, and the installation was made by Siemens, of London, and is composed as follows:

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1. Of an alternate current Siemens dynamo machine furnished with an exciting dynamo in the ordinary manner and actuated by a motor of from 20 to 30 horse-power. It feeds thirteen Siemens differential arc lamps of 50 carcels—ten scattered in the engine-room and fire-room, one in each signal light at the ship's sides and one at the mizzen. The same source feeds besides about 59 20-candle Swan lamps.

***

2. A compound Siemens' dynamo machine with a double inductor circuit absorbing 30-horse power and feeding a system of 200 to 250 Swan lamps distributed throughout the ship. These lamps are scattered with profusion throughout the saloons, smoking rooms, dining saloons, corridors, and produce a fine effect. Each cabin is furnished with a lamp and a commutator within reach of the berth, permitting each person to instantaneously light or extinguish the lamp; a very useful arrangement and one which will certainly be welcomed by the passengers.

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3 A dynamo machine similar to the preceding and also furnished with its motor for use in exchange for the former in case of necessity.

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4. A battery of 50 accumulators, of the English Electric Power and Storage Company used to regulate the lighting and to be substituted for the mechanical sources in case of stoppage.

The installation is well made; the accessories, lustres, globes, elegant and easy to manage; the working leaves nothing to be desired.

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The motors have a single cylinder and make 150 revolutions, the electrical machines make 600 revolutions per minute The multiplication and intermediate transmission is made by belts or cog-wheels.

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The Compagnie Générale Transatlantique had already lighted, by the aid of accumulators, several of its packet ships, such as La France, La Canada, l'Amerique, and Le Labrador, but the last installation much surpasses the preceding, and is perhaps the most complete which has hitherto been made.

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In Calais the Maritime Railway Station is regularly lighted by electricity.

Overthrow of the Barb Fence Patents.

For several years past the manufacture of barbed fencing wire has been under the control, substantially, of a single concern, namely, the Washburn & Moen Manufacturing Company of Worcester, Mass. They acquired an eminent position in the trade in its early days by the exercise of superior skill and enterprise in producing machinery to make the wire, by honest endeavor to furnish a first-class article, by promptness in filling orders, and finally by contenting themselves with a very small margin of profit. This was the original basis of their trade; it has been steadily maintained, and upon it has arisen the gigantic business now governed by the corporation.

As soon as the barb fence business began to develop into large proportions, other makers became anxious to dip in and grasp a share; this they could only do by supplying an inferior article. To protect themselves as far as possible to prevent the ingress and competition from makers of poor stuff, Washburn & Moen bought up all of the principal patents relating to barb fences; they then applied to the Patent Office and obtained reissues of some of the oldest of these patents, on which new and broad claims were allowed. Some of these reissued claims covered a wire or fence bar of any sort having barbs or points upon it. Other claims were for mechanism of any description for making any kind of barb fence. With these claims and reissues, some of which had been tried and sustained by the courts, the manufacture was so guarded and surrounded by bristling patent points, the margin of the profit being low, that few makers have cared or ventured to fight the Worcester holders, but have preferred to pay them a small royalty as licensees.

Under several decisions of the Supreme Court of the United States in various cases it has been laid down as a new rule that the reissue of an old patent so as to make it cover, by new claims, any new or broader ground than the original patent, is invalid.

In view of these decisions Griesche & Fuchs refused to pay royalty to Washburn & Moen. Issue was joined, and on the 4th inst in the United States Circuit Court St. Louis, Mo., Judge Treat decided the case, holding in effect, that the broad claims of the barb fence patents are invalid, both as respects the article produced and the machinery for making the same.

The magnitude of the barb fence business will be understood when we state that the estimate of the quantity of this fencing made in 1882 was 80,000 tons or 500,000 miles in length.

The firms claiming under their patents the exclusive right to manufacture barbed wire are said to have made within the year in royalties from their licenses and from extra profits in their own business between $4,000,000 and $5,000,000.

The royalty, though large in the aggregate, amounts in the detail only to $2 per 1,000 feet of fencing—not a heavy burden upon individual farmers.

Those who imagine that the overthrow of these patents is likely to result in any material reduction in the price of barb fencing, as paid by consumers, probably are mistaken.

The decision may bring about a greater division of the trade and its profits than now exists, but where the margin of profit is already low there is not much room for the lessening of prices to the general public.—*Scientific American.*

Professor Edison kindly sends us the following very interesting communication, recently received by him from Mr. J. E. Richter, Brisbane Water, Sydney, Australia:

March, 1883.

Professor T. A Edison:

DEAR SIR.—Some two or three years ago you sent me, to my order, a speaking phonograph. It arrived in good order. It is an instrument of no great utility, though on many occasions it has afforded me immense amusement in the consternation of some of the people who sometimes assemble to hear it. A certain neighbor of ours, a Highlander Scotchman, ignorant and very clannish, had a habit of singing doleful Scotch songs whilst at his daily labor. An employe of mine, having a great power of imitation, could rehearse the Scotchman's songs exactly—voice, cough and all. One day Scotty was working close to our house, and as usual singing in his peculiar way. Advantage was taken of this circumstance, and Scotty was informed by the man that the boss had a machine in the house that was listening intently to all that he had been singing, and would rehearse it at any time required. Scotty stood open-mouthed in blank wonderment and credulous, and was easily persuaded to come and see for himself after the dinner hour. Advantage was taken of his absence to prepare a foil sheet, a verse of two or three songs sung that morning being loudly sung by the imitator into the phonograph. On his return he examined the machine in every particular, then requested a reproduction of what he had sung that morning in a defiant air, feeling assured in his own mind that nothing of the kind could occur. The handle was turned The first notes that pealed forth produced such an eery feeling over the man in his superstition that he turned white in the face—the notes produced had such an unearthly sound about them. The machine went on into the second verse of another song. The man's eyes rolled about from one to another in mute consternation; a terrible agitation was going on in his breast. He stood it all until the last verse was nearly sung out; then he made a rush for the door, which was open, declaring that "the de'il was in the hoose," sprang over the house away toward his own house. He has never been near the place since. Whenever any labor has now to be performed on that part of his farm close to my farm, another person is now sent to do it. Nothing will induce him to come near my residence again.

Pacific Telegraph.

It is understood that the Canada Pacific telegraph system will be established about the 1st of July, with the central office in Winnipeg. The C. P. R. Syndicate will soon have in operation a line extending from Port Arthur, on the east, to Medicine Hat, on the west, and being extended with the grading of the road towards the Rockies In a year or two they will have a telegraph system extending along their line from Montreal to Port Moody. This will be the overland part of a scheme of connecting Europe with China and Japan by a direct line much shorter than that now used.

Electric Lights in Providence—A 200-Light Plant.

The American Electric and Illuminating Company, which has had an exhibition plant in the Butler Exchange for the past two months, is showing a remarkable amount of enterprise and business push. They are about to put in a large plant in this city, and will be ready for business by the middle of next month. Every new enterprise of this kind will receive a hearty welcome in Providence.

The company closed, on Saturday, a five years' lease of the new brick building just completed by the Slater Mill and Power Company, of this city, in the rear of the roller skating rink, and will occupy it at once with machinery for electric lighting. The company proposes to put in its equipment for beginning business immediately, and will be ready to fill contracts for furnishing lights at a date not later than July 15.

The company propose to establish the most completely equipped central lighting station of its size in the United States. The room for the station is 100 feet long and 80 feet wide, in addition to which there is a large boiler-house now in process of construction, which Mr. Barstow promises shall be completed and ready to receive the boilers by Saturday next. The company propose to begin with a 200-light plant, with facilities for enlarging it to such an extent as will enable them to supply any additional demand for their lights.

The machinery that is to be put at once will consist of two steel tubular boilers of 100-horse power capacity each, with Jarvis furnaces; four Armington & Sims high-speed engines, 50-horse power each, built by Armington & Sims Engine Company, of this city; and eight Thomson-Houston dynamo machines, of from 25 to 30-light capacity each.—*Providence Press, June* 19.

THE ERIE TELEPHONE AND TELEGRAPH COMPANY controls all the American Bell telephone rights in Cuyahoga County, State of Ohio. The above company, whose center is Cleveland, Ohio, was purchased of the original owners Monday, June 18, 1883, by the Lowell Telephone Syndicate, by whom the business will be continued. Capital, $1,000,000; par value of shares, $100. Management: Wm. A. Ingham, President; Loren N. Downs, General Manager; Chas. J. Glidden, Treasurer; Wm H. Bent, Attorney. There are at the present time 1,500 subscribers. The contract with the mother company has seven and one-half years to run. The property is one of the most perfect and best constructed telephone plants in the United States. The City of Cleveland, by the census of 1880, showed a population of 160,142; to-day the population is over 210,000. The city is on Lake Erie and Cuyahoga River, 125 miles from Columbus, and 195 from Buffalo, N. Y. Engaged in commerce, manufactures, and ship building, and is a center for the exchange of produce of Ohio and the West for the manufactures of the East. Railroads connect with all the principal cities East and West.

Electricity in France.

In the Municipal Council of Rouen a scheme has been started for turning the Seine to account as a means of supplying force for working dynamo machines intended to supply the city with electric light. The practicability of this scheme is now under consideration. The motors are to be put up at Pont de l'Arche, and from thence the conductors are to proceed which are to go all over Rouen and Elbeuf. It is also intended to put up some powerful arc lamps in the Cathedral, some 200 feet above the ground The light of these is to be scattered in the streets by means of reflectors.

Something for Nothing.

All newspaper publishers have had experience with men who want to advertise themselves or their business without cost to themselves. It is pitiable to see the shabby means they take to attain the end they have in view.

Men who would feel insulted if they were called dead-beats will with bland effrontery ask a publisher to "please mention so-and-so" (an advertisement), or, handing in what is really an advertisement under the guise of a communication, they will say: "Here's a little item that will help you fill up with." Men who do this—and there are some in every town—call themselves honorable, and would not think of asking a real estate owner to let them use one of his houses a few months for nothing; nor would they ask him to let them cultivate and use a part of his farm, without expecting to have to pay rent for it.

The advertising columns of his paper are to the publisher what the house or farm is to the real estate owner—his source of income. Why anyone should expect the newspaper publisher to be more generous in squandering his substance than any other business man, is something that cannot be accounted for, except on the supposition that some persons have an idiotic idea that printers set up type for the love of the work, and that ink and type and printing presses are gifts from heaven to sinful men, who publish newspapers merely for the purpose of smoothing the pathway of their fellow-men on the rugged road to fortune, and who hope not for reward this side of the grave.—*Texas Siftings.*

Manufacturing News.

A $100,000 cotton factory is being constructed at Clarksville, Habersham County, Ga., for some Atlanta capitalists.

The Acushnet Paper Mill is a new enterprise about to go into operation at New Bedford, Mass. The paper which it is intended to manufacture at present will be used for capet linings and is made from cedar bark.

The Nova Scotia Glass Works, New Glasgow, Me., are now in full operation and turning out a large amount of glassware. At present there are on the pay-roll 160 hands, and the wages paid weekly amount to over $1,000.

The contract has been given for plans and specifications for a new cotton mill at Florence, S. C., $116,000 having been raised for the purpose. The factory will have 10,000 spindles, run by steam power.—*American Machinist.*

Mr. Rufus T. Blake, manager of the Sterling Organ Company, Derby, Conn, is at Martha's Vineyard. We regret to learn that our old friend has a return of the malaria every summer, and hope that the fresh breezes at "Martha's" will bring returning health.

The Russell Hardware Company will soon be organized in Haddam, Conn., with a capital of $150,000. Colonel Charles T. Russell and Hon. Clinton B. Davis are among the managers. Buildings will be erected near the Haddam Depot, and fifty men are to be employed.

The Newark and Bloomfield Horse Car Company, Newark, N. J., have erected a small building in which to make their own tools and run dynamo machines for the Daft system of electrical railroads soon to be put in operation on their line. They will put in a Wright engine and boilers.

The Lanesville Electric Light Company, of Lanesville, Ky., have recently placed their order with Messrs. Edw. P. Allis & Co., of Milwaukee, for a 20x42 Reynolds-Corliss engine, complete with boilers, heater, pump, &c., to drive an electric light plant. The Reynolds-Corliss engines are becoming very popular for electric light engines.

Simpson, Hall, Miller & Co., Meriden, Conn, have laid the foundation for a new four-story factory. The building will be 100x40 feet, constructed of brick, and will be used for the glass-cutting and plating departments. The structure will be one of the most imposing of the company's buildings and will occupy a position west of the present office.

A new company, composed of leading capitalists of Atlanta, Ga., has been formed for the erection of another cotton factory there, and this will make four cotton factories for Atlanta. The capital stock is $200,000, and the gentlemen forming the company already own an eligible site. It is supposed to make the heaviest grades of duck cloth in the new mill.

A fine new mill was erected, a few months ago, on Fisher's Lane, Germantown, by Messrs. Wade & Schuhknecht. The building is 60 feet by 45 feet. The establishment is now running full time on suspender and truss webbing, and ladies' belting and garter webbing, in silk, cotton, and worsted. The machinery is of the best class, and it is run by a 6-horse power engine.

Hotel Belmont, Old Orchard, under the ownership and management of Mrs. F. B. Flint, is one of the very best hotels on the beach. The house has accommodations for 125 to 150 guests, and is supplied with electric bells, speaking tubes and all modern appliances. Pure spring water has recently been introduced, and Mrs. Flint's cuisine has never yet been excelled by any summer hotel in Maine.

The foundation is in for the Corliss Safe Manufacturing Company's new works, Providence, R. I. The total length of the machine shop will be 467 feet 4 inches. The center portion, 174 feet 8 inches long, will be 69 feet wide, and each end will be 58 feet 4 inches wide. A building in the rear, 137 feet by 52 feet 8 inches, will be occupied by blacksmith shop, boiler house, grinding room, woodwork room, etc.—*American Machinist.*

The Williams Sewing Machine Company have displayed commendable energy in rebuilding and re-fitting their Montreal factory. It will be remembered that this factory was burned to the ground less than three months ago, leaving nothing standing but a few portions of the wall, which had to be pulled down. Their new factory is almost finished, and the new machinery is being put in place. In a few weeks everything will be in running order again, and those of the old force of workmen who were transferred to the Plattsburg factory after the fire will return to their old quarters.

A meeting of the several committees which have the project of the Centennial Cotton Exposition in charge was held in New Orleans, May 14th. A charter of incorporation was adopted, and thirteen directors, to be styled commissioners, were chosen. These are Edward Richardson, who is to be president; Albert Baldwin, E. A. Burke, Duncan F. Kenner, John T. Moore, G. A. Breaux, S. Hernsheim, E. M. Hudson, S. H. Buck, and W. B. Schmidt, all of New Orleans; Thomas Hardeman, of Georgia; Gov. R. M. Patton, of Alabama; and F. C. Morehead, of Mississippi. The capital stock is to be $500,000, represented by 20,000 shares of $25 each, payable as follows: 30 per cent. in cash, and the balance in installments of 10 per cent. each, on notice of 30 days. The name of the corporation is to be the World's Industrial and Centennial Cotton Exposition. The incorporation is for ten years, and the exposition is to cover not only matters pertaining to cotton, but the products of agriculture, mines, and industrial arts of all sorts.

Killed by Electricity.

KANSAS CITY, Mo., June 21.—John Parvey, an employee of the Telegraph Company, while repairing a line, was killed by a shock, the current being turned on without warning.

NEW PATENTS—ELECTRICAL—1883.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING JUNE 5, 1883.

278,679 Arc-lamp cut-out; Charles B. Bosworth and Frederick A Swan, Boston, Mass.

278,730 Angle-hanger for mechanical telephone lines; George F. Shaver, Erie, Pa.

279,023 Automatic electric-circuit opener; Wm. H. Sawyer, Providence, R. I.

278,881 Commutator for electric apparatus; Wm. H. Chapman, Middlebury, Vt.

278,911-12 Dynamometer; Albert H. Emery, New York, N. Y.

278,983 Dynamo-electric machine; Abram M. Loryea and Charles H. Palmer, New York, N. Y.

278,811 Electric wire; Charles McIntire, Newark, N. J.

278,832 Electric lamp; Pierre Tihon, Lyons, France.

278,846 Electric circuit and apparatus for synchronizing clock pendulums; Henry L. Bailey, Brooklyn, N. Y.

278,385-6 Electric-wire protector; Joseph O. Cotterell, Fanwood, N. J.

278,898 Electric gas-lighting apparatus; Rudolf Einbigler, New York, N. Y.

278,940 Electric railway signal; William Hadden, Brooklyn, N. Y.

278,946 Electric clock movement; John Happersberger, Cincinnati, O.

279,007-8 Electric motor; Charles C. Peck and William H. Chapman.

279,045 Electric-magnetic motor; William M. Thomas, Cincinnati, O.

279,065 Electrical apparatus for automatic signaling; John C. Wilson, Boston, Mass.

279,103 Electric arc lamp; Joseph Olmstead, New York, N. Y.

278,753 Insulating telegraph wires; Thomas A. Smyth, Chicago, Ill.

278,976 Magnetic separator; Joseph La Breche Viger, Montreal, Quebec, Canada.

278,760 Rotary electro-magnetic motor; John B. Atwater, Chicago, Ill.

278,797 Support for electric lamps Albert L. Ide, Springfield, Ill.

278,908 Telegraph and telephone cable; Charles Huck, New Orleans, La.

A printed copy of the specification and drawing of any patent to the annexed list, also of any patent issued since 1865, will be furnished by any of the patent solicitors whose advertisements appear in this journal. In ordering please state the number and date of the patent desired.

BUSINESS NOTICES.

Bradley A Fiske, Consulting Electrical Engineer, 59 Astor House. Advice to inventors, calculations, etc.

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New York, June 13, 1883.

The Board of Trustees of this company have this day declared a dividend at the rate of 12 per cent. per annum on the preferred capital stock, out of net earnings for the first five months of 1883, payable on Monday, July 2, 1883, at the office of the company, 44 East 14th st., New York city, to stockholders of record, June 20, 1883.

The transfer books of the company will be closed at 3 P.M. on Wednesday, June 20, and will be reopened on the morning of Tuesday, July 3, 1883.

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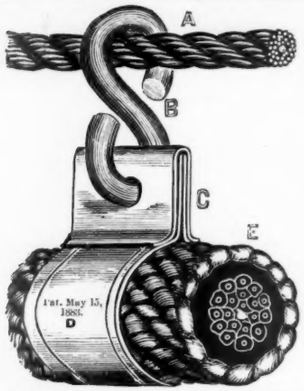

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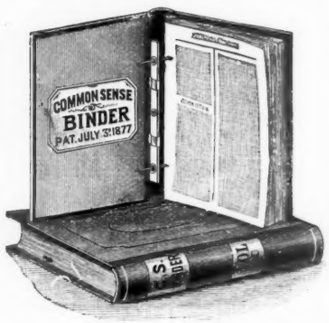

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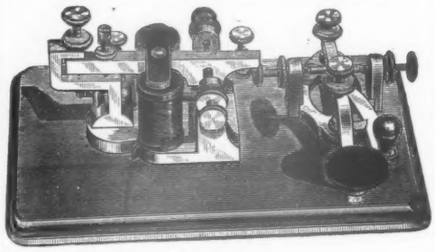

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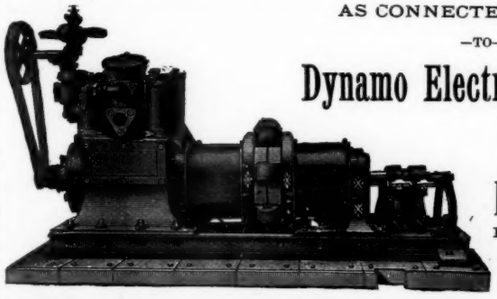

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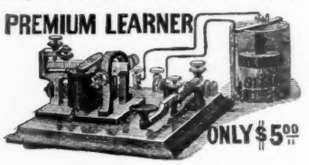

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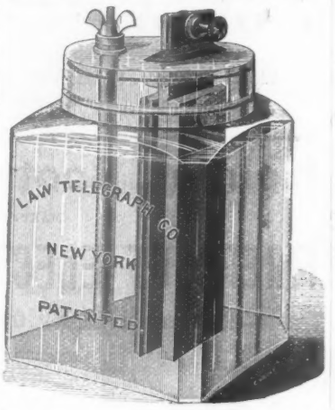

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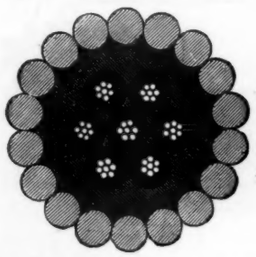

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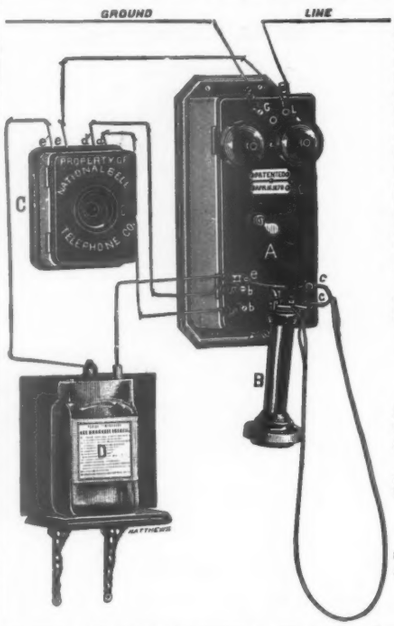

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